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ON THE MEASUREMENT & COMPARISONS OF SOCIAL CONTRIBUTION DEGREE BY ENTERPRISE

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Tokyo, Japan.

The following two points are the major part of my field of vision which forms the basis of my argument about the subject.

1. The enterprise is a historical existence

Capital accumulation has always been considered as the most priority objective since the age of self-interests seeking through the age of corporate growth. However, the intellectuals have, at long last, begun to realize that this world consists of a closed system and that human beings can no longer be sure of their infinite expansion and it will be necessary to act their own "inner check and self-improvement." They now feel that the "internal fullness" will be the only way for their existence to survive. For one example, saving of consumer's waste can make abatement of pollution possible.

Accordingly, the enterprise will have to move in the direction reorganizing itself to be a social resposibility-minded enterprise which aims to actualize human values. At the present time it is an age of transition and confusion, in which enterprises are experiencing a switchover from the stage of "corporate feudalism" to the stage of "multi-objective enterprise".

2. From now on, the enterprise should be a "human-value actualizing system" as a sub-system of the emerging social system

It is desirable that the social framework or "order" versus "freedom" keep each other in an equilibrium. Self-reliance of individuals and enterprises must be increased in proportion to the reinforcement of the social framework. For this purpose, the basic constitution of the enterprise must be improved by all means. Also it will be necessary that the enterprise be a "corporate citizen" in the realizable, far-reaching common trinity among the enterprise, local community and consumer. Furthermore, the enterprise should be dependent upon citizens—"life innovators"—for its growth.

In the "Keynesian Revolution", the Depression had been overcome by transferring the power of economic control from private sector to the state (on the other hand, "Neo-Mercantilism" or "New Conspiracy between

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Business Circles and Government" in the case of Japan had been already pushed on with militarism). But now it is necessary to establish one's own identity through self-innovation by "life-innovators" (awakened consumers) who are endeavoring to correct the rampant group egoism (including that of the modern state) in order to overcome the "stagflation" that is now establishing itself as the "monster of the century".

Close analysis of actual details of the "corporate social responsibility" which has been much discussed so far, on the other hand, reveals that it is closely associated with "multiplicity of enterprise's objectives". Accordingly, the "corporate social responsibility" including the related corporate objectives can be historically classified into the following seven categories. From Theories of the Classical School to Theories of new models oriented to consumer, citizen and culture.

(a) Theories of Profit-earning:

(i) The primary corporate objective is maximum profits or maximization of profits in the long run.

(ii) The primary corporate objective is acquisition of second-best profits, some levels of satisfaction. In both cases, capital efficiency and finance-oriented models are built.

(iii) Surplus values are obtained through capitalist exploitation of labor. So socialization-oriented models are built.

(b) Theory of Maximization of Manager's Utilities and of devotion to his work. One-man-control-oriented models are built.

(c) The primary corporate objective is welfare of employers and employees. So partnership-oriented models are built.

(d) The corporate profit is one of inducement factors or a part of Corporate Results. The primary corporate objective is its social survival (existence and development)—in other words, securing its stabilized growth. So corporate autonomy-oriented models are built.

(e) Theory of Maximum Sales (which presupposes acquisition of minimum profits) or Theory of "Increase of Customers". Consumer-oriented models are built.

(f) The enterprise is a corporate citizen which is part of the entire social strcuture. So citizen-oriented models are built.

(g) The enterprise is required to contribute to the cultural progress of the society. So culture-oriented models are built. In the point of view of the Spheres of corporate objectives, however, the following four theories can be theoretically classified.

(i) Theories of Profit-earning with the Conditions of Fair and Free Competition.

(ii) Theories of Corporate Moral Responsibility: The concept that a commercial enterprise is not responsible for what is beyond its powers, is now outdated. The enterprise, which is the most powerful organization in the modern age, is required to make more

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social contributions than provided for in the law. There still remains the problem of "how many contributions", but the enterprise should not pay lip service to this subject as a sort of camouflage, or not use some contributions as an indulgence.

(iii) Theories of Corporate Functional Responsibility

(1) Positive Theory: The enterprise has only to increase its social merits—for example, to accomplish its original functions such as "to offer better products at lower prices".

(2) Theory of Minimum Social Costs: The enterprise should minimize its social demerits. If the enterprise has some social demerits, it should bear the costs for getting rid of the demerits.

(iv) Theory of Structural Renovation.

The enterprise should renovate its structure so that its renewed structure may have the above-mentioned original corporate functions and social contributions as its built-in elements. At least, the enterprise should have a new corporate structure in which the enterprise can bear related social costs. For example, divisional control system through dual management and social audit system for holding each other in check—at least an effort to provide an open forum for debate through disclosure of corporate financial data. Thus, "Capitalization of social costs" (a sort of deferred asset operation) as advocated by Dr. C. C. Abt is not satisfactory.

To sum up, the corporate performance should be assessed not only in terms of sales and profits but also in terms of social contributions, just as a man's value is assessed not only in terms of his earning capacity but also in terms of many other factors of human nature. And it is essential that the enterprise's social contributions should be measured by objective standards (in order that there may be little or no arbitrary subjectivity involved). However, there are various criteria for measuring the social contribution degree and it is very difficult to measure exactly the after-effects of the social contributions. Therefore, I have employed an accounting method which makes possible quantified measurement of social costs (although indirectly), on the assumption that each social result spent by the enterprise as a rational user can have its own social effects.

In this method, a new, separate statement—"Result Distribution Statement"—has been added to the current financial statements. In "Compound Responsibility Accounting System and Mode" developed by the Japan Management Association (Nihon Noritsu Kyokai), on the other hand, social results and private costs are entered in parallel in a similar statement. This confuses the accounting purpose. Also in the current profitability-oriented accounting system, the social results compete with net profits in the financial statements, and therefore it is likely that the former is neglected. Mixing-up of measurement of the economical efficiency and that of the social contributions of an enterprise results in unnecessary accounting confusion and frustration on the part of corporate

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workers. Incorporation of the "Result (Value Added) Accounting System" into the current business accounting system is, first, in compliance with the business community's current accounting practices in which this system is used as a supplementary means, and, secondly, aims to establish the accounting basis for the realizable common trinity among the enterprise, local community and consumer.

Then, I think I must answer a question—"To what extent is the specific indication of the Social Results effective? Multiple assessment is most desirable, but many corporate managers say, "A corporation will go bankrupt when the corporation's financial results continue substantially to be in the red." They should be aware, however, that it is all right with the corporation if it gains minimum revenues for its survival and that the current profitability-oriented accounting system is working effectively for them.

I think it is desirable that, as the enterprise grows out of the commercial enterprise stage into the multi-objective enterprise stage and further into the corporate social responsibility state, the three major corporate results—"Labour Results", "Capital Results" and "Social Results"—keep each other in an equilibrium on the basis of minimum margins. Awareness of "human life worth living", "self-actualizing needs" and various aspirations for social needs, all of which serve to offset decline of "profit-motives", these motives will be increased. There are already indications of this new trend.

In brief, the accounting method I have employed is aimed at comparing ratio of Social Results in enterprise with that of Labour Results and Capital Results. The merits of this method are:

1. It provides precise figures.
2. The value added accounting which forms the basis of this accounting method is destined to be the accounting basis for the realizable common trinity among the enterprise, local community and consumer extending beyond the idea of partnership in management.
3. This accounting method is linked to that of the national economy as a whole.

This method, however, is still in its rudimentary stage. Even the method of computing values added lacks unity at the present time. There are various methods made public through literatures and publications released at home and abroad. I have selected one in which I take great interest since it is capable of comparison by the corporate unit. It is *Analysis of Business Management*: 1971, 1972 and the First-half of the Fiscal Year, 1973, cf. 1974, 1975 and 1976/9, published by Mitsubishi Research Institute. Just as the Bank of Japan's method, it is based on "additional system, amount of sales base and gross value added system."

I would like you to refer to the following book dealing with personnel

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expenses in terms of Labour Results, and with depreciation expenses, financial expenses, rental fees and net profits in terms of Capital Results.

Analysis of Business Management, "The Research Method", published by Mitsubishi Research Institute.

As regards the Social Results, I have collected data through a questionnaire survey entitled "Questionnaire Survey on the Social Contributions of Enterprises."

But I regret that I have not been able to prepare sufficient data because of deficiencies of the present business accounting system.

If public realization and business men's efforts to measure "the social contribution degree of enterprises centering around the Social Results" are on the increase every year, significant measurement results about social contribution degree will be enlarged and become more precise.

Here I will intend to bring forward a problem and thereby trigger to debate about it.

CHART 1
QUESTIONNAIRE SURVEY ON SOCIAL CONTRIBUTIONS OF ENTERPRISES

(1971, 1972 and 1973/9 cf. 1974, 1975 and 1976/9)

Company Name:
Name of Responsible Person:

FOR CONSUMER

1. Sales price reduction and/or increase (1971, 1972 and 1973/9 cf. 1974, 1975 and 1975/9)
   Reduction: Unit Price: Aggregate: Ratio:
   Increase: Unit Price: Aggregate: Ratio:
2. Expenses incurred for product warranty and safety.
3. Other expenses incurred for customer service.

FOR LOCAL COMMUNITY

4. Amount of money invested in pollution abatement and its ratio to total equipment investment values (stock portions are not included as "Social Results").
5. Consequent depreciation expenses, interests paid, etc.
6. R & D expenses for the environmental improvement.
7. Expenses for prevention of industrial hazards and disasters.
8. General Compensation.
9. Expenses for environmental improvement in plants.
10. Expenses for maintaining welfare facilities for use by local community residents.
11. Other contributions, etc.

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FOR EMPLOYEE (This item is indicated in the remarks column of "Results Distribution Statement")

12. Method of administering retiring allowance payments:

Debit		*Credit*	
Retiring Allowance	xxx	Current Deposit	xxx
Retiring Pay	ooo	Borrowing	ooo

If the covering of retiring allowance is deficient, its amount.

13. Estimate of the corporate financial burden (real increases of salaries and wages) to result from start of 5-days work per week:
Date started 5-days work per week:
Method:

14. Does your company offer to employees residential houses and residence lots which your company owns (or owns specially for this purpose)? Number of incidences and total amount of money:
If "no", does your company plan to implement such program in the future ?

15. Does your company offer to employees low-interest loans for purchasing residential houses or defrayable part of their loan interests ?
Number of incidences and total amount of money. If "No", does your company plan to implement such program in the future ?

16. Does your company offer to employees long-term and low-interest loans in the form of "Workers' Asset Formation System" ?
Number of incidences and total amount of money: If "no", does your company plan to implement such program in the future ?

17. Does your company have a stock sharing system ? If "no", does your company plan to implement such program in the future ?

18. Your company's actual examples of employee's participation in business management and control.

Since the amounts of Social Results calculated through this kind of questionnaire survey, especially environmental improvement costs, are not stationary ones, presuming "traditional value added amount minus taxes" is 100%, I will show the ratio of Social Results to be 100%.

Nowadays, however, "taxes" (the amounts of "tax and public dues" and "provision for corporation tax" in *Analysis of Business Management*) are the main part of Social Results.

These Social Results should be regarded as a sort of positive potentiality of Asset (but it should be dropped out every year), not be regarded as costs diminishing value of profit. They are, therefore, listed on "Results Distribution Statement", not on "Profit and Loss Statement."

The criteria of the achievements estimation of enterprises should,

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therefore, depend on the dual system of criteria, "Profit and Loss" versus "Social Contribution Degree."

The enterprises objectified to the survey were 83 companies except Sankyo Co. which was exposed to the fact of window-dressing settlement, and include principal enterprises, by which all kinds of industries beginning from food and beverage to precision instrument, musical instrument and service industry are composed of. I don't think it complete because of the restriction of data, and am going to refine on this method in due order.

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THE EFFECT OF INCREASED EXPORTS ON OUTPUT AND EMPLOYMENT IN A DEVELOPING AND A DEVELOPED COUNTRY: A TWO-COUNTRY, MULTI-SECTORAL ANALYSIS*

A. PARIKH†

Introduction

The aim of the paper is to simultaneously analyse the effects of an increase in exports[1] and employment in a developed, and a developing country[2]. A general equilibrium model with fixed domestic input coefficients is developed, and although disequilibrium is initially generated, equilibrium is restored through a subsequent foreign exchange effect in the developing economy. The empirical analysis is based on trade between India and the U.S.A., and although only a two country model is outlined, generalisation to multinational trade is possible.

Four effects of export expansion are considered: (i) a *direct effect* dealing with the immediate generation of output and employment in a sector; (ii) a *linkage effect* referring to the output and employment generated in supplying industries (e.g. raw materials, and machinery); (iii) a *multiplier effect* which considers the enhanced purchasing power generated by the employment created by the direct and linkage effects[3]; (iv) *foreign exchange effect* which considers the consequences of an easing of the bottleneck restricting the demand for non-consumer imports. This essentially

*Presented at Fifth World Congress of Economists, Tokyo (1977). Reproduced by courtesy of Macmillan Press Ltd., London.

†The author wishes to thank Mr. M. Bell for his computational assistance in preparing section 2 and data appendix, and Mr. R. Edwards for section 3.

[1]The paper does not attempt to deal with the effects of a liberalisation of trade between developing and developed countries. This in itself is a very difficult question to answer in the face of tariff, or non tariff barriers, and the statistical requirements would be formidable. Instead, the analysis is based on a hypothetical increase in exports from a developing to a developed country.

[2]It is not the sole purpose of the paper to argue that a policy of export promotion would aid in the reduction of unemployment in densely populated developing countries, but also to suggest a methodological framework for the analysis of the problem. Watanabe (1970) suggests that about 30% of the total employment in Korea in 1969 was directly or indirectly attributable to exports, see Morawetz (1974).

[3]The multiplier effect creates demand for domestically produced and imported goods, the latter forming a leakage from the system.

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incorporates the modern[4] view that industrial growth requires many strategically important goods which may not be domestically produced, but which may become available by export expansion and the acquisition of foreign exchange (or indeed through foreign aid).

Under the assumption that no excess capacity exists, a dynamic factor is introduced owing to a time lag between investment and output. In a closed economy, the scope for reducing unemployment through the production of labour-intensive commodities is restricted by domestic demand structures. This restriction is greatly relaxed on consideration of foreign trade, and is further relieved owing to new investment opportunities.

Section I of the paper considers the basic models, the empirical properties of which are discussed in section II. Section III goes on to examine various dynamic properties of the models. The data used are summarised in Appendix I.

I

Dynamic Models Based on Input-Output Analysis

Firstly, a list of the variables is presented:

Endogenous Variables:

C_t = vector of consumption by sectors in period t

I_t = vector of investment by sectors in period t

X_t^d = vector of gross domestic output by sectors in period t

X_t^m = vector of gross imports by sectors in period t

NEI_t = vector of Net Exports by India to U.S.A. generated by foreign exchange

$NE2_t$ = vector of Net Exports by India to the rest of the world generated by foreign exchange

$\overset{\circ}{X}_t^d$ = vector of changes in grosss domestic output by sectors in period t

$Y1_t^m$ = vector of additional imports by India from U.S.A. generated by foreign exchange earnings.

[4]The classical view is that foreign aid has the sole effect of supplementing domestic saving in the recipient country (Chenery and Bruno). The modern view is an extreme form of the idea of comparative advantage associated with the growth process. However, both the saving rates of the former, and possibilities for export of the latter, depend on the level of economic development.

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Exogenous Variables and Parameters:

α_1 = Marginal propensity to consume[5]

α_2 = Marginal propensity of rest of the world to import from India[6]

α_3 = Marginal propensity to import

$M = [m_{ij}]$ = Matrix of coefficients of imported inputs per unit of domestic output

$D = [d_{ij}]$ = Matrix of coefficients of domestic inputs per unit of domestic output

$B = [b_{ij}]$ = Matrix of coefficients of capital inputs per unit of domestic output

X_0^d = Vector of base year domestic outputs by sectors

β = U.S. imports from India as a proportion to world imports

θ = U.S. exports to India as a proportion to world exports

E_{t_m} = Exports by sectors, given exogenously

Y_{2_t} = Imports by India from the Rest of the World entering final demand.

Using this notation the model may be written as

Version I

$$[C_t] = (\alpha_1 - \alpha_3)[1 - D][X_t^d] \tag{1.1}$$

$$[I_t] = [B][\overset{\circ}{X}{}^d] \tag{1.2}$$

$$[Y_t^d] = [C_t] + [I_t] + [E_t] + [\mathrm{NE1}_t] + [\mathrm{NE2}_t] \tag{1.3}$$

$$[X_t^d] = [D][X_t^d] + [Y_t^d] \tag{1.4}$$

$$[X_t^m] = M[X_t^d] + [Y1_t^m] + [Y2_t^m] \tag{1.5}$$

$$[\overset{\circ}{X}{}_t^d] = [X_{t+1}^d - X_t^d] \tag{1.6}$$

$$[Y1_t^m] = \theta[(1 - \alpha_3) + (1 - \alpha_3)^2 + \ldots][E_t] \tag{1.7}$$

$$[NE1_t] = \beta[\{(1 - \alpha_3) - \alpha_2(1 - \alpha_3)\} + \{(1 - \alpha_3) - \alpha_2(1 - \alpha_3)\}^2 + \ldots)[E_t] \tag{1.8}$$

$$[NE2_t] = (1 - \beta)[\{(1 - \alpha_3) - \alpha_2(1 - \alpha_3)\} + \{(1 - \alpha_3) - \alpha_2(1 - \alpha_3)\}^2 + \ldots][E_t] \tag{1.9}$$

[5]The marginal propensities to consume and import are assumed constant across sectors owing to the lack of data at the sectoral level.

[6]The marginal propensity of the rest of the world to import from India may be interpreted as the Indian marginal propensity to export to the rest of the world.

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Calculation reveals values of 0.0077 and 0.0142 for β and θ respectively, which along with the estimated marginal propensities to consume enables us to write (1.8) and (1.9) as

$$[NE1_t] = 0.0197[E_t] \tag{1.8*}$$

$$[NE2_t] = 2.52[E_t] \tag{1.9*}$$

The total demand for the ith good in period t is thus

$$\sum_{j=1}^{n} a_{ij}X_{jt}^{d} + \sum_{j=1}^{n} b_{ij}[X_{j,t+1}^{d} - X_{j,t}^{d}] + \bar{C}_{it} \tag{1.10}$$

where $[a_{ij}] = [d_{ij} + m_{ij}]$ and $\bar{C}_{it} = NE1_{it} + NE2_{it} + (\alpha_1 - \alpha_3)[1 - D][X_t^d]$.

The second term of (1.10) may be understood by supposing that the production processes involved require a *stock* of goods (i.e. capital) as well as a *flow* of current inputs, the stock being built up by investment. The sectoral investment requirements are based on a one period lag, implying that any extra output is required in the next period, the necessary investment is undertaken in the present period. If K_{ijt} is the amount of the ith good required as a capital input per unit of output of the jth commodity in period t, then the total stock of the ith good required as capital is given by

$$K_{it} = \sum_{j=1}^{n} K_{ijt} = \sum_{j=1}^{n} b_{ij}X_{jt}^{d} \tag{1.11}$$

Under the assumption of freely transferable, and fully employed capital, K_{it} denotes supply as well as demand. It then follows that

$$I_{it} = \Delta K_{it} = K_{i(t+1)} - K_{it} = \sum_{j=1}^{n} b_{ij}[X_{j(t+1)}^{d} = X_{jt}^{d}] \tag{1.12}$$

The analysis of investment through this sort of accelerator principle requires a knowledge of the capital coefficients matrix B, where b_{ij} denotes the amount of output of the ith sector required as investment goods per unit increase in net capacity of sector j. This is not affected by replacement investment[7] (Manne, 1974). If the convenient assumption that replacement is proportional to capacity, these requirements can be directly incorporated into the D and M matrices.

Consumption, $[C_t]$ in (1.1), is assumed to be a fixed proportion of net output (defined as gross domestic output less intermediate inputs). This proportion $(\alpha_1 - \alpha_3)$ represents the marginal propensity to consume less the marginal propensity to import out of total value added, and is assumed constant owing to the lack of data at a sectoral level.

The parameter θ in equation (1.7) should represent U.S. exports to India as a proportion to total world imports, but, owing to lack of data, a plausible value of 0.0142 is adopted. Of an assumed $ 1 million worth of

[7]If replacement investment is ignored, we are assuming indestructible fixed capital.

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total exports, the first round net earnings are $ 0.64 million, and so on, ad infinitum. This operates under the assumption that not all of the initial $1 million worth of exports accrues as net earnings, owing to the fact that increased exports generate a requirement for additional imports[8], either directly, or indirectly (for the production of the commodities exported). The latter effect is not explicitly considered. The equation as a whole indicates that all of the foreign exchange earnings are used to finance additional imports (both from the U.S.A. and the Rest of the World), which are endogenously determined. (An alternative interpretation is that additional imports from the U.S.A. are determined by the product of the marginal propensity to import from the U.S.A., and the foreign exchange earnings.)

Equations (1.8) and (1.9) represent the net exports to the U.S.A. and the Rest of the World respectively[9] (induced by foreign exchange earnings). The idea again is that not all foreign exchange accrues as *net* earnings. If the developed country has earned say $ 0.8 million of foreign exchange, it may be that 10% of this has been already spent on the direct and indirect requirements of producing the original exports, leaving $0.72 million as net earnings. This sort of process continues in higher expenditure rounds ad infinitum. The chain is emphasised by the fact that only two countries are considered, though there is a leakage from the system in the form of exports to the rest of the world from India. In fact, the equations are cast in terms of India's marginal propensities to import from, and export to, the U.S.A.[10]

India's total exports may be obtained by a summation of the vectors $[NE1_t]$ (to U.S.A.), and $[NE2_t]$ (to the Rest of the World), but in this two country model the interest lies in the isolated effect of U.S. expenditure on Indian exports. Consequently the analysis is limited to a consideration of $[NE1_t]$. In fact, it is generally true of this model that *total* net exports are a magnified version of exports to the U.S.A. (about 2.5 times as large), so that the analysis may easily be extended to a consideration of the former without substantially affecting either the assumptions or results.

[8]The implication is that the foreign exchange earned by additional exports worth 1 million dollars must be adjusted for two leakages, the first being the total value of imports induced by the extra exports.

[9]This implies that any imports by India generate foreign exchange earnings by the U.S., which are in turn used to buy imports from India. This again generates foreign exchange for India, which is used to import from the U.S. This allows us to work through the system, allowing for leakages, using the proportions outlined.

[10]No firm estimates are available. Consequently the assumption is made that the Indian marginal propensity to import from the U.S.A. is 0.07, whilst her marginal propensity to export to the U.S.A. is 0.02. Historical estimates of the relationship between changes in imports and G.N.P. in 36 developing countries over the period 1960–70 have been made by UNCTAD. No studies on propensities to import from individual countries are available, however.

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The resulting net exports constitute the foreign exchange effect, and the assumption is made that all additional exports form part of domestic final demand. An alternative approach would have been to include the impact of additional exports directly into the consumption equation, under the assumption that, say 60% is consumed directly, the other 40% contributing to final demand imports. There is no substantial difference between the two approaches in terms of the implications of the model.[11]

The model as it stands incorporates all the four effects of an export expansion; (i) A solution in terms of its reduced form may be obtained[12] and the effects of an increase in exports can be traced through output, imports and each of the components of demand. The model uses the general interindustry dependence of input-output analysis in a slightly modified form. The balance equation of the standard Leontief model is partitioned into domestic and imported components. For expository purposes, at present, we assume investment to be exogenously given. The balance equations for n sectors given in (1.4) and (1.5) are:

$$X_i^d = \sum_{j=1}^{n} d_{ij}X_j^d + Y_i^d, \quad i = 1, \ldots, n \tag{1.13}$$

$$X_i^m = \sum_{j=1}^{n} m_{ij}X_j^d + Y_i^m, \quad i = 1, \ldots, n \tag{1.14}$$

Rewriting (1.13) and (1.14) in a partitioned matrix form, we obtain

$$\begin{bmatrix} I - D & 0 \\ \hline -M & I \end{bmatrix} \begin{bmatrix} X^d \\ \hline X^m \end{bmatrix} = \begin{bmatrix} Y^d \\ \hline Y^m \end{bmatrix}$$

Solving the above partitioned system for $[X^d]$ and $[X^m]$ we obtain

$$[X^d] = [I - D]^{-1}[Y^d] \tag{1.16}$$

$$[X^m] = [M][I - D]^{-1}[Y^d] + [Y^m] \tag{1.17}$$

The partitioning of the system is necessary because the imports of intermediate goods and services are not produced in the home country, and, therefore, labour is not used although such intermediate imports increase the productive capacity in the home economy.

The model includes an equation on new investment or new capital requirements, the structure of which is assumed to be constant. Although the investment function is an accelerator relationship, the character of the model is still static because the effect on investment is worked through in

[11]Since $(\alpha_1 - \alpha_3)$ is assumed to be identical for all sectors, it does not make much difference whether the impact of net exports is added to domestic final demand, or to consumption. The former will yield a slight overestimate of final domestic demand owing to the fact that leakages in the form of imports induced by the production of the net exports are not allowed for. This aspect is considered in version II of the model.

[12]As this is trivial, the exercise is not carried out.

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the same manner as for other primary input requirements, such as imports, employment etc. This assumption is relaxed later in Section 2, when we discuss the complete simultaneous differential/difference equation solution of the system.

The employment effects can be worked out by premutiplying a gross domestic output vector by a diagonal matrix of labour coefficients (labour per unit of gross domestic output) in a static framework. Analytically, the sectorwise direct and linkage effects may be obtained from

$$[1][I - D]^{-1}[Y^d] \tag{1.18}$$

where [1] and $[Y^d]$ are diagonal matrices. The diagonal elements of (1.18) are defined as direct employment while the off-diagonal elements are indirect or linkage effects on employment. The foreign exchange and multiplier effects are incorporated in $[Y^d]$.

Equations (1.1) to (1.9) determine the total impact on the economy. $[X_t^d]$ can be written either as difference or differential equation solution.

$$[X_t^d] = [D][X_t^d] + [C_t] + B[X_{t+1}^d - X_t^d] + [E_t] + [NE_t] \tag{1.19}$$

and

$$[X_t^m] = [M][X_t^d] + [Y_t^m]^{13} \tag{1.20}$$

Defining

$$[R] = [I - D + B],\ [R][X_t^d] = [C_t] + [E_t] + [NE_t] + [B][X_{t+1}^d] \tag{1.21}$$

Since R^{-1} exists, we can write:

$$[X_t^d] = [R^{-1}][C_t + E_t + NE_t] + [R^{-1}][B][X_{t+1}^d] \tag{1.22}$$

Alternatively, for a constant final demand, we can write the solution of simultaneous linear difference equations in terms of the eigenvalues and eigenvectors of the characteristic equation[14], $[I - D - \lambda B] = 0$.

$$[X_{nt}^d] = A_1\alpha_{1n} \exp(\lambda_{1t}) + A_2\alpha_{2n} \exp(\lambda_{2t}) + \ldots + A_n\alpha_{nn} \exp(\lambda_{nt}) + N \tag{1.23}$$

where $[\alpha_{1n}][\alpha_{2n}] \ldots [\alpha_{nn}]$ are the values corresponding to the eigenvalues $\lambda_1 \ldots \lambda_n$ of the matrix $[I - D - \lambda B]$. Each of $\alpha_1 \ldots \alpha_n$ is a vector. $A_1 \ldots A_n$ are constants determined from initial gross output levels and

$$[N] = [I - D]^{-1}[Y^d] \tag{1.24}$$

For this system, imports can be obtained by substitution of $[X_t^d]$ on the righthand side of (1.20). Y_{t1}^m is determined within the model while Y_{t2}^m is

[13]Where $[Y_t^m] = Y1_t^m + Y2_t^m]$

[14]This is so since we may write

$$[X_{t+1}^d - X_t^d] = \lambda[X_t^d]$$

where λ is the rate of growth (identical in all sectors of the economy).

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given exogenously. Y_t^m can thus be given a numerical value. The employment effects can be worked out for each period by premultiplying $[X_t^d]$ by [1], a diagonal matrix.

Version II

This approach differs from Version I in that the foreign exchange effect is directly incorporated into the consumption function, instead of net exports. The implications are that foreign exchange does not go towards an increase of nonconsumer imports for the relief of bottlenecks (lack of productive capacity) in the domestic economy, and all net earnings are spent on domestically produced output. This model may be written:

$$[C_t] = (\alpha_1 - \alpha_3)[I - D][X_t^d] + (\alpha_1 - \alpha_2)[NE_t] \tag{1.25}$$

$$[I_t] = [B][X_{t+1}^d - X_t^d] \tag{1.26}$$

$$[Y_t^d] = [C_t] + [I_t] + [E_t] \tag{1.27}$$

$$[NE_t] = \{I - [M][I - D]^{-1}\}[E_t] \tag{1.28}$$

$$[Y_t^m] = (-\alpha_1 + \alpha_3)[NE_t] \tag{1.29}$$

$$[X_t^d] = [D][X_t^d] + [Y_t^d] \tag{1.30}$$

and

$$[X_t^m] = [M][X_t^d] + [Y_t^m] \tag{1.31}$$

Most of the equations are similar to those of the previous model, except for the case outlined. Also, equation (1.27) now incorporates any increase in exports as a direct addition to aggregate demand. There will be a consequent multiple effect generating a total increase in value added and employment in excess of the initial increase in exports. The magnitude of this effect will obviously depend upon the leakages from the system (e.g. saving, taxation, final demand imports etc.)[15]. This version of the model is perhaps more appropriate for oil exporting countries, where foreign exchange is not scarce and the bottlenecks consequent upon its absence are not present.

The assumption that an improved foreign exchange position will result in an increase in domestic consumption is a convenient aid to solution, but is likely to be unrealistic for a country such as India. For instance, an increase in the availability of foreign exchange is likely to result in a change in the structure of imports. At first $[M]$ will be an increasing function of foreign exchange earnings as import bottlenecks are removed[16].

[15]Although these leakages are not explicitly considered, they may be thought of as being included in the determination of marginal propensity to consume.

[16]Shortage of foreign exchange and balance of payments difficulties are often important factors affecting the rate of capacity utilisation. In India, the requirements for maintenance imports proved so high over the Third Five-Year Plan (1966–71) that

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Thereafter, as substitution of domestically produced inputs for imported inputs takes place, $[M]$ would become a decreasing function of foreign exchange earnings, and $[D]$ would be an increasing function of the same variable. In principle it is possible to take such changes in structure into account within the model[17].

An alternative, and more practicable approach to this, is to assume that all net foreign exchange earnings consequent upon an expansion of India's exports to the U.S.A. are spent on goods from the U.S.A., the total amount being allocated across the sectors according to the base-year import proportions[18], under the assumption that all of these goods are intermediate imports. The actual process is carried out as follows:

Define:

$$[\hat{M}'] = \text{diag}\left(\frac{\hat{M}_1}{X_1^d}, \ldots, \frac{M_n}{X_n^d}\right) \tag{1.32}$$

as the diagonal matrix of the base-year import proportions by sectors. Then

$$[\hat{M}'][D] = [M^*] \tag{1.33}$$

yields the import requirements per unit of gross domestic output.

$$[M] + [M^*]$$

will be the new import coefficients matrix, which will be higher than $[M]$ suggesting an increase in productive capacity. In practice it was found that the import proportions were too small to make any significant difference[19], so that this form of structural change was ignored.

II

This section presents a static analysis of the Indian and U.S. economies in terms of their labour, capital and import requirements.

Various methods of comparing factor intensities have been developed. The most usual are those which rely on the measurement of productivities at an industry level, such as value added per person, or gross output per

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they could not be covered by the gains from trade. The balance of payments position of many developing countries is weak, suggesting that policies such as foreign trade restrictions and exchange control are possible causes of the shortage of the raw materials necessary for the full utilisation of capacity.

[17]This approach would introduce many complexities, and the requisite data do not exist.

[18]This was found to be one of the best methods of obtaining imports according to end use, in the absence of direct estimates (Parikh, 1976).

[19]This could be due to the classificatory scheme. It could be that only a few sectors experienced increased imports, in which case the proportional allocation system would be unsatisfactory. In the absence of the relevant direct estimates, this approach has been ignored in the rest of the paper.

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person engaged. The weakness of such procedures is that the resultant measures may be dependent upon the value of other purchased inputs, which may vary from country to country for reasons totally unconnected with factor productivities.

Consequently, the procedure adopted here is to compare the factor requirements per unit of final demand in each sector. This cannot be correctly stated by an examination of the direct input coefficients, owing to the consequent neglect of the indirect requirements. Thus, a comparison of labour intensities for example would require a premultiplication of the Leontief Inverse of the domestic coefficients matrix by the direct labour coefficients vector, enabling a direct comparison of *total* labour requirements (direct plus indirect), of each sector, per unit of final demand in each sector. Obviously then, the economy which requires the most labour in a sector may be said to be more labour intensive in that sector[20].

As a preliminary, the disaggregate national tables of the two countries are examined, though an international comparison is rendered impossible by differences in classification (81 sectors for the U.S.A., and 66 sectors for India). The figures are obtained by a premultiplication of the Leontief Inverses of the domestic coefficients matrices by the direct factor coefficients vectors[21], and are subject to the limitations of the data discussed in Appendix 1, (e.g. the incorporation of competitive imports into gross domestic output in the U.S. tables).[22]

Owing to space considerations, only the principal results are discussed. In sector 18 of the U.S. economy, an increase in any of the final demand components, say exports, of 1 million, the extra employment generated would be 93 man years, the corresponding figure in other supplying industries being up to 64 man years. Also indicated is that the Agriculture, Wooden Containers Footwear, Livestock and Apparel industries rank amongst the ten most highly labour-intensive sectors of the economy. Most of the service sectors are among the top twenty labour users, whilst Machine Shop Products, Household Furniture, Lumber and Wood Products, and Automobile Repairs are only moderately intensive in labour.

In the Indian economy, the employment creation of an extra 1 million of final demand in the Textile sector will be 975 man-years, and for some other industries, the figure is up to 3,225 man-years. These estimates appear to be very high, but are to be expected owing to the relative labour intensiveness of India over the U.S.A.

[20]Labour productivity is defined as the reciprocal of the employment per 1 million dollars of final demand (see Parikh, 1974). It should be borne in mind that this is a different concept to the usual value added per person engaged, or per operative.

[21]Data on capital-output ratios are not available for the 81 sector scheme in Almon et al (1974).

[22]Owing to space considerations, the numerical results are not presented, but may be obtained on request from the author.

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In order to facilitate an international comparison of factor intensities, it is necessary that the sectoral classifications for the countries should be identical. This was achieved for the U.S.A. and India by an aggregation of their national tables into a homogeneous scheme. This was done for three levels of aggregation: 8, 22, and 26 sectors[23]. The details of this procedure are given in Appendix I. Also, three alternative estimates of labour requirements (on the basis of high, moderate and low labour coefficients) are considered, the details of which are given in Appendix 2.

An examination of the U.S. economy on the basis of the 8 sector scheme reveals that Agriculture, Services and Commerce are the most labour-intensive sectors, whilst, in India, Agriculture has the highest labour requirement, with Mining and Manufacturing second and third on the list.

The import requirements of the U.S.A. in the cases of Agriculture and Mining are higher than for other sectors of the economy, in comparison to similar sectors of the Indian economy. The total capital requirements for all sectors of the Indian economy are higher than those of the U.S.A., reflecting a possible existence of excess capacity and mis-investment in Indian industries, the three main causes of which may be (a) indivisibilities of plant and equipment causing capacity to be built up ahead of demand and a temporary underutilisation; (b) supply bottlenecks and shortages of complementary factors of production; (c) monopolistic or at least oligopolistic market structures leading to production at levels below the minimum average cost point. The second of these is the one most likely to affect a developing economy, in that it may result from balance of payments difficulties[24], or from unbalanced growth. In India, only a limited number of industries report a utilisation rate of more than 75%, the most usual range being between 65% and 75% (UNIDO, 1970). In certain industries the rate is as low as 35%. The conclusion is strengthened by the fact that these figures tend to underestimate the problem, since the measure of excess capacity is usually based on the number of shifts considered normal by owners or managers, and not on the maximum number technologically possible.

For 22 sectors, Restaurants, Hotels, Government Services and Agriculture, Forestry and Fishing are highly labour intensive sectors in the U.S. economy. The import requirements on average are in the region of 60,000 dollars worth per 1 million dollars of final demand. The 'Other

[23]The labour requirements for the Indian Economy are based on 1 million rupees of final demand in each sector, and are converted by exchange rates for comparability with the U.S. figures, though this procedure is subject to some reservations (David, 1971).

[24]A scarcity of imported supplies may cause underutilisation. In addition, the problem may be the result of the import licensing policy, owing to tendencies to apply for larger amounts than necessary, and the granting of smaller quantities than applied for.

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Mining' sector is the most import intensive. For the Indian economy, the petroleum and coal products sectors are the most import-intensive and it is clearly reflected that the import requirements in agriculutre are much less than in the U.S. Agricultural sector. Overall, the import intensity seems to be similar. Again, the capital requirements are higher for almost all sectors of the Indian economy in comparison with the U.S. economy.

For 26 sectors, we find that Agriculture, Footwear and Clothing, Furniture and Fixtures are labour intensive sectors in the U.S. economy. Metal Mining, Other Nonmetallic Mining and Other Services (because of the classification problem are relatively more import intensive than other sectors of the U.S. economy. Paper products, Printing and Petroleum and Coal Products are highly import intensive in the Indian economy. The capital requirements for the Indian economy are generally higher for almost all the sectors when they are compared with the U.S. economy (Appendix Table 3).

III

In this section, the solutions of dynamic difference/differential equations for the Indian and U.S. economy are derived, and the potential growth rates of economies are presented.

Dynamic Analysis

Static analysis can be used for estimating the employment effects of export expansion. If exports increase by 1 million dollars, the employment generation, investment and import requirements can be determined from one of the three tables presented in Appendix 2. This analysis, however, is not based on the dynamic model presented in Section I. For this model, data on exports from India to U.S.A. are required. As we do not have the necessary data for constructing a forecast of the product distribution of exports from India to U.S.A. and U.S.A. to India, it was decided to examine the effects of a typical vector of exports[25] from India to U.S.A. and U.S.A. to India. This vector is estimated from the actual composition of such exports in dollar values in the year 1970.

Exports in the initial round for the Indian economy are used to derive the net exports by sectors to U.S.A. These net exports include the impact of foreign exchange. Similarly, the net exports by sectors to the rest of the world are derived. The U.S.A. earns foreign exchange by exporting machinery or maintenance goods to India, and after allowing for leakages, a part of these earnings is spent on Indian products, giving rise to net

[25]These typical export vectors are derived from the U.S.A. imports from India and vice-versa, expressed as a proportion to the total. Since they are proportions, the c.i.f.—f.o.b. difference is unlikely is play an important role.

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exports from India to U.S.A. At the same time, the U.S. can spend a part of its net foreign exchange earnings of products originating from the rest of the world. If the U.S.A. earns net foreign exchange of 0.72 million dollars on account of India's imports of 0.80 million dollars of maintenance imports, a small part (assumed 0.0197 million dollars) is spent on Indian goods and the rest may be directly added to U.S. final demand imports (Y_{i2}^m). The multiplier effect is introduced through the final domestic demand equation.

The complete solution of the simultaneous linear differential equation is given in (1.23). The solution with a real nonsymmetric matrix may however involve complex roots. Also, some of the roots, in principle, could be negative. There is, however, a guarantee due to the Frobenius Theorem II[26] that there will be at least one dominant characteristic root which will be non-negative and that the characteristic vector corresponding to this root will be non-negative. In all cases, a positive characteristic root and characteristic vector is found, aiding the solution of the differential equations. The characteristic root of $[B][I - D]^{-1}$ gives the greatest rate of balanced growth of which the system is capable.[27] Both Mathur[28] and Dosso use this Frobenius root in a similar way, excepting that Dosso in their model specifies consumption endogenously determined.

Since the solutions of homogenous and non-homogenous differential equations are not very different from the point of view of the balanced rate of growth of an economy, we present the solution of the homogenous part (Appendix 3, Tables 4, 5 and 6). The non-homogenous part does not make significant difference to the constants owing to the small values of the eigenvector and the large value of the constant in the homogenous part. Consequently, an adjustment of $[I - D]^{-1}[E_i + NE1_i]$ for India or for the U.S.A. to the base year output $\{X_i(0) - [I - D]^{-1}[E_i]\}$ makes hardly any difference to the constant.[29]

[26]Frobenius Theorem II states that if A is a non-negative $n \times n$ matrix, then the matrix has an eigenvalue $\hat{\lambda} \geqslant 0$ such that with $\hat{\lambda}$ we can associate an eigenvector $\hat{x} \geqslant 0$. Other propositions are given in Makayama (1973, p. 375).

[27]Mathur's result in the context of the Stone-Brown model (where consumption is growing exponentially) is different in the sense that it concerns the growth rate in the single sector of final consumption.

[28]The output requirements for each sector in Mathur's formulation are given by

$$[I - A - r_i B]^{-1}[Y^d] = [X^d]$$

where r_i is the rate of growth in sector i. This gives the result that

$$\{p_i I - [B][I - D]^{-1}\}^{-1}$$

will be non-negative only if

$$p_i \geqslant p$$

where p is the largest characteristic root of the matrix

$$B[I - D]^{-1}$$

[29]A comparison reveals less than a 1% difference between the values obtained by solution of a complete non-homogeneous system, and these resulting only from the homogeneous part, after allowing for the multiplier effect.

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The results presented in Tables 4, 5 and 6 assume values of 0.6 and 0.1 for the marginal propensity to consume and the marginal propensity to import respectively for U.S.A., whilst for India, 0.8 and 0.2 are taken as the corresponding values. The explicit consumption function will affect the growth rate of the economy. The growth rates[30] turn out to be 21%, 20% and 19% for the 8, 22 and 26 sectors schemes of the Indian economy respectively, whilst the U.S. growth rates are 35%, 49% and 51% respectively. These balanced growth rates seem meaningful and their magnitudes seem reasonable.

It is found that for India, as the sectors become more disaggregate, the growth limit of the economy drops and smaller potential growth rates will be observed. Barker (1971) concluded conversely with a U.K. study that as more sectors are distinguished, the limit to any sector's growth rate rises. Such results are. however, observed with the U.S. growth rate as the number of sectors increases.[31] It is clear that the potential balanced growth rate for the U.S. economy is higher than for the Indian economy.

The total effect of an increase in exports on the Indian economy is given by the following expression, based on version I of the model outlined in section I:

$$\frac{1}{(1-\alpha_1+\alpha_3)}\,[I-D]^{-1}[E_t+NE1_t+NE2_t] \tag{3.1}$$

and the corresponding effect on employment is given by

$$\frac{1}{(1-\alpha_1+\alpha_3)}\,[1][I-D]^{-1}[E_t+NE1_t+NE2_t] \tag{3.2}$$

When balanced growth is introduced into the system the resulting employment effect is

$$[1][I-D]^{-1}[E_t+NE_t]+\lambda[1X^{d-1}][X^d] \tag{3.3}$$

An increase in Indian exports to the U.S.A. obviously leads to an increase in the imports of the latter. However, the consequent acquisition of foreign exchange by India will lead to an increase in imports from the U.S.A., and a consequent increase in the exports of the latter. The resultant effect on the U.S. economy is

$$\frac{1}{(1-\alpha_1'+\alpha_3')}\,[I-D]^{-1}[NE1_t] \tag{3.4}$$

[30]The growth rate for a consumption less society (all net output used for additional investment) would be 35, 33 and 31% per annum for the Indian economy, and 70, 98 and 103% for the 8, 22 and 26 sector schemes in the U.S. economy. Allowing for consumption halves the potential growth rates for the U.S. and cuts the Indian potential to about 67% of the consumption less potential.

[31]Unfortunately, the theory of aggregation has not yet reached the point where it can give us a clear reason for this phenomenon.

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where α_1' and α_3' represent the marginal propensities to consume and import respectively of the U.S.A. The corresponding employment generation is then given by

$$\frac{1}{(1-\alpha_1'+\alpha_3')}[1][I-D]^{-1}[NE1_t] \tag{3.5}$$

Version II implies a different solution to the non-homogeneous part of the difference equations. Since consumption and investment are endogenously determined through equations (1.25) and (1.26) we may write

$$[Y_t^d] = (\alpha_1 - \alpha_3)[NE_t] + [E_t] \tag{3.6}$$

Tables 4, 5 and 6 refer to the non-homogeneous parts of the difference equations determined by NE_t alone. The solution of this for India is given by

$$[Z_t] = \left\{\frac{(\alpha_1-\alpha_3)}{(1-\alpha_1+\alpha_3)}\right\}[I-D]^{-1}[NE_t] + \frac{1}{(1-\alpha_1+\alpha_3)}[I-D]^{-1}[E_t] \tag{3.7}$$

The corresponding employment effect is then given by

$$[1X^{d-1}][Z_t] = Z_t^* \tag{3.8}$$

i.e. the column vector $[Z_t]$ is premultiplied by the row vector of labour coefficients, yielding a scalar employment effect. Since, in this version, there is no foreign exchange impact, there is no corresponding generation of employment in the U.S.A. The employment effects implied by the two versions are summarised in Table I.

TABLE I

EMPLOYMENT IMPACT OF EXPORT EXPANSION (IN MAN-YEARS)—EXCLUDING EMPLOYMENT IN AGRICULTURAL SECTOR

Number of Sectors	Version I		Version[2]
	India[1]	U.S.A.[3]	India[4]
8 sectors	512 (41)[2]	14	1142
22 sectors	573 (49)[2]	14	925
26 sectors	481 (32)[2]	14	748

[1] $\left(\frac{1}{1-\alpha_1+\alpha_3}\right)[1X^{d-1}][I-D]^{-1}[E_t + NE_{t1} + \mathrm{NE}_{t2}]$ where $[NE_{t2}] = 2.52[\mathrm{NE}_{t1}]$

[2] $\left(\frac{1}{1-\alpha_1+\alpha_3}\right)[1X^{d-1}][I-D]^{-1}[NE_{t1} + NE_{t2}]$ (foreign exchange effect)

[3] $\left(\frac{1}{1-\alpha_1'+\alpha_3'}\right)[1X^{d-1}][I-D]^{-1}[NE_t]$ (Foreign exchange impact in U.S.A.)

[4] $[1X^{d-1}][Z] = Z^*$ where $[Z] = \left(\frac{\alpha_1-\alpha_3}{1-\alpha_1+\alpha_3}\right)[I-D]^{-1}[\mathrm{NE}_t] + \left(\frac{1}{1-\alpha_1+\alpha_3}\right)[I-D]^{-1}[E_t]$ (Multiplier and Initial Impact).

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In the first version, not exports to the rest of the world and to the U.S.A. from India are explicitly computed allowing both for the multiplier and foreign exchange effects. The model, however, does not allow for the secondary multiplier effects of net exports generated to U.S.A. and the Rest of the World. The foreign exchange impact is not very effective in generating employment in India as it is measured by the second term given in Table 1, footnote 2. The employment generated in the first version of the model which embodies the multiplier effect of the initial exports, and the foreign exchange effect, is about 512 man-years in the Indian economy, whilst the foreign exchange impact of the Indian economy including imports from the U.S.A. creates 14 new man-years in the U.S.A. The second version of the model yields around 925 new jobs excluding agricultural sector. We have excluded employment generation in the agricultural sector because in the Indian economy, there is a possibility of disguised unemployment in that sector.[32]

Empirically, if it were intended to separate out the contribution of three effects on employment, it could broadly be indicated that (512 less 41) 471 new jobs are generated due to initial export expansion[33] in the Indian economy, 41 jobs due to foreign exchange and about 413 new jobs due to the multiplier effect of net exports[34] (925 (median figure) less 512).

The model provides the estimate on a technological upper limit to sustainable growth in the output and final consumption for any sector. Indeed, there are constraints on economic growth (such as the size of the labour force) or foreign trade, and if these relationships were introduced in the model, the limit would probably change. We have assumed that the input-output coefficients and other parameters are fixed (not price sensitive) and if price-sensitivity is introduced, the limit on growth may again be relaxed. If labour force constraint is introduced into the model, the U.S. economy would be unlikely to achieve a growth rate above 10% to 15% per annum.

For the Indian economy, various approaches to the estimation of unemployment have been adopted (Sen 1974). The estimation of the

[32]If the employment in agricultural sector is not ignored, the total impact in the first version is about 2,000 new jobs while the second version yields about 2,900 new jobs. About 1,870 new jobs are generated due to the initial export expansion, 115 due to foreign exchange effect and about 1,050 new jobs to the multiplier effect of net exports.

[33]It should be borne in mind that net exports are defined in a different way in version 2, which could lead to a slight overestimation of the multiplier effect compared with the implication of version 1.

[34]The loss of employment in the U.S.A. on account of 1 million dollars worth of exports by India to the U.S.A. will be of the order of 122 man-years. If foreign exchange impact is realised by India through U.S. exports, this will be reduced to about 108 man-years. All this is based on the assumption that there is an exact replacement of a given value of output in a developed country by an equal value of imports of products produced in developing countries.

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minimal number of job-seekers based on the recognition approach, yields a figure of around 21 million.[35] This estimate yields about 10% unemployment, and with an assumed growth in labour force of around 3% per annum, this results in a figure of 13% as the unutilised labour force from year to year. The potential growth rates for Indian economy are higher than the growth rates which might be permissible by the available labour force. A policy of exports expansion using relatively more labour will yield higher growth and lower unemployment for such a country. Indeed, the existence of excess capacity and misinvestment may have produced very high overestimates of potential rates of growth. If excess capacity were to be fully utilised by export expansion in acquiring foreign exchange to remove bottlenecks due to shortages of raw materials or maintenance imports, the prospects of achieving higher growth and lower unemployment are strong.

The principle practical conclusion emerging from this analysis is that exports will generate a large amount of employment in a developing economy if all the effects of export expansion are realised. Consequently, if developed countries followed a policy of removing tariffs and non-tariff barriers, the densely populated developing countries could adopt outward-looking policies (export expansion) leading to a decline in unemployment and higher economic growth. This will enhance the use of manpower resources which some of the developing countries have in large quantities, and which remain unutilised at present.

APPENDIX I

Data Adjustments and Classification Schemes

This appendix provides a discussion of the data, classification schemes and the matching of the Standard International Trade Classification (S.I.T.C.) of the United Nations with the Standard Industrial Classification (S.I.C.) of the U.S.A. A concordance between the classification for the Indian input-output table and the S.I.T.C. is also attempted. Various numbers of sectors are considered: 8 sectors, 22 sectors, 26 sectors. These three classification schemes include all sectors and are derived from a disaggregated input-output transactions matrix. The U.S. original table of 347 sectors has been reduced to 81 sectors for the year 1963 in the *Survey of Current Business* (1969). The Indian input-output table for 1973–74 is available for 66 sectors and this is also used in the study. Although the time-periods of input-output tables are different, this will not cause a

[35]This is fairly close to the estimates of unemployed and seriously unemployed, based on a concensus of the income, and recognition approaches, used by the Committee on Employment (19 millions), and Raj Krishna (1973) (21 millions).

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great deal of difficulty, partly because our exercise is illustrative and the Indian economy in 1973–74 will not presumably have the 1963 technology of the U.S.A. It is also plausible that the 1963 technology of the U.S.A. will be relatively less labour intensive (more capital intensive) than the 1973–74 technology of India. Data on employment for 66 sectors in terms of labour co-efficients were compiled by Nambiar (1972) for India. The data for the Indian economy refers to the year 1965, while the input-output table is the 1973–74 at 1971–72 prices. This implies that we are using the productivity levels of 1965 for the Indian economy with the technology of 1973–74. Input-output tables for the year 1963 are available, but these tables do not distinguish import transactions separately. Consequently, such tables cannot be used for employment analysis, since for producing intermediate imported inputs in the home economy, labour is not used, and, therefore, employment is not generated. The use of a technology matrix instead of a coefficients matrix will result in considerable over-estimation of employment.

The treatment of imports in the U.S. input-output tables does not permit the construction of a matrix of import coefficients. The procedure in the American input-output table is to combine competitive imports with the domestic supply and thus import coefficients represent total supply both domestic and foreign. Only non-competitive imports which are not produced domestically are allocated directly to the consuming industries. This is given as a row of (non-competitive) imports in the U.S. input-output table.

It should be mentioned that, for U.S.A. and India, capital coefficients data are not available, and for the Indian economy, the data on capital-output ratios are highly suspect because they are not capital-capacity ratios and hence there is considerable danger of overestimation. Besides this, the Indian data may be average capital-output ratios, rather than incremental capital-output ratios. We summarise the available data on capital-output or capacity ratios in subsequent paragraphs.

The basic data on capital in terms of new capital purchases is given in the Survey of Current Business (Young, Naley, Reed and Seaton, 1971). These transactions are recorded at 1963 producers' prices and are not capital coefficients. Young, Maley et al (1971) present estimates of the flows of new structures and equipment from producing to using industries. The table contains 85 industries of which nine do not have any new capital purchases. Down the side of Table 1 in their study are listed 31 industries producing new equipment and a single industry producing new construction. There are no attempts made by the Office of Business Economics to compile data on capital coefficients and as the data produced in matrix form are of a flow character, we could not justifiably use it in the dynamic Leontief input-output model. We have, however, made use of this flow data to find out the effect of export expansion on new capital

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purchases (investment requirements in terms of new capital only). Almon, Buckler, Hurwitz and Reimbold (1974) give capital-output ratios for various industries, and although this is a row we can use it in the model. The capital stock is calculated by a method that approximates the productive capacity rather than the book value of the stock. The method of two bucket curves is described in Almon et al (1974, p. 69). Two classes of capital are distinguished: the first is that which has not been written off, whilst the second has been written off but is still in service. The first class stock, K_t, grows by the gross investment V_t, and falls by a percentage spilled S_t. The second class stock of capital grows by the depreciation out of the first class stock and falls by the same per cent depreciation[1].

$$K_t = K_{1t} + K_{2t} = K_{1t-1} + V_t - S_t K_{1t-1} + K_{2t-1} + S_t K_{1t-1} - S_t K_{2t-1} \tag{A.1}$$

We have also compared capital-output ratios to new investment-output ratios (new equipment structures data) and we find that capital-output ratios are about 5 to 6 times the new investment-output ratios. We assume the life of capital equipment to be infinite, and for a neat set of estimates one would consider the finite life of capital equipment[2].

In Table 3.2 (Alman, 1974, p. 72), data on the stock of equipment and capital-output ratios for the year 1955, 1960, 1965 and 1970 are available in millions of 1969 dollars. We have used 1965 capital-output ratios and have classified according to 8, 22 and 26 sectors, the details of which can be obtained from the author. For the disaggregated capital-output ratios, we find both significant falls from 1955 (e.g. in floor coverings and knittings) and substantial rises (e.g. in construction, sugar, logging and lumber and glass) since 1955.

For the Indian economy, capital output ratios are compiled by Nambiar (1972) at a sectoral level. Although there are many pitfalls in the estimation and use of these capital-output ratios, they are expected to reflect approximately the capital structure of the economy. Mahalanobis (1962) mentions that capital-output ratios are highly sensitive to fluctuations in demand or other factors. The larger the oscillations in any economy, the larger would be the fluctuations in the numerical value of the capital-output ratios and less useful will be such ratios for theoretical or practical purposes.

Next, we make use of the following three homogeneous classification schemes in addition to the national schemes adopted by India and the

[1]Stocks of fixed capitals by industry of origin are divided by capacity outputs of industries of use to derive capital-capacity ratios. These data are gross capital-stocks coefficients.

[2]It seems unlikely that minor changes of this nature would substantially alter the results, but there is no doubt that refinement of capital coefficients would produce neater results.

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U.S.A. The analysis of trade expansion between India and America can only be attempted if Indian input-output sectors can be matched with the United States. It was not possible to reduce the entire 81 sectoral scheme of the United States to the 66 sectors of India.

Three schemes were attempted. Firstly, both the Indian and U.S.A. tables have been reduced to 26 sector, disaggregated according to the old International Standard Industrial Scheme[3]. The 22 sector scheme[4] was adopted in the System of National Accounts (S.N.A.) and the 8 sector International Standard Industrial Classification[5] scheme was adopted in the International Labour Yearbook, while compiling the employment data from population censuses. The 8, 22 and 26 sector classifications were compiled on more or less the same basis using the detailed industry classification of the 1963 input-output tables (Survey of Current Business, 1969) as guidelines. The approach was of necessity partly intuitive and hence some details may be slightly inaccurate.

The next (and somewhat more complicated) stage was the compilation of a concordance between the three classifications and the standard International Trade Classification (S.I.T.C.). This is absolutely vital because our trade data (exports and imports) are derived from the United Nations Trade Statistics and O.E.C.D. Trade by Commodities books for the year 1970. The source used was the concordance between SNA and SITC published in the Handbook of International Trade and Development Statistics (United Nations, 1972). From this source and using the United Nations Conference on Trade and Development (UNCTAD, 1970) as a guideline, a concordance was established between 81 sectors of the United States input-output table and SITC groups. Since the SNA concordance related only to industry and not to commerce, etc., only visible trade data could be used. To obtain the concordance of the 8 and 26 sector levels, the two previous concordances were used in conjunction with another between SITC (revised) and ISIC (former) published in the Chris Michelsen Institute's (1972) document. For the Indian economy, almost the same methods were used.

The 1963 input-output study of 81 sectors shows United States exports by producing industry in the final demand column of Table 1 labelled 'Net Exports'. As the footnote at the end of the table indicates, except in the case of rows 80A and 80B, these entries represent gross exports. An input-output industry concordance of U.S. imports cannot, however, be readily derived from the published input-output table. The task of compiling such data on imports is very time-consuming and is perhaps beyond the means of a single individual researcher. We have tried to obtain

[3]Growth of World Industry (1970).
[4]J. Skolka: Chris Michelson Institute, Department of Humanities (1970).
[5]International Labour Office Yearbook (1970).

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a matching of SITC with input-output sectors in a very broad sense for 8, 22 and 26 sector classifications.

The matching of SITC with input-output sectors becomes necessary in our study because in the input-output analysis exports by sectors from U.S.A. to the world, and similarly for the Indian input-output table imports from and exports (by sectors) to the world are given. In a two country model, we require exports from U.S.A. to India and imports from India to the U.S.A. In order to obtain these statistics, we have to use OECD trade by commodities (Origin-Destination) data. These data are collected according to SITC categories and thereafter, distributed according to 8, 22, 26 and 81 sector schemes for the U.S.A. The trade figures are available only for visible trade and the last 17 of the 81 sectors are ignored in the analysis because they are service sectors. Similarly, for the Indian economy, data on exports and imports by sectors to the U.S.A. were collected. As we find that there is a discrepancy between Indian exports to the U.S.A. and U.S. imports from India due to f.o.b. (free on board) and c.i.f. (carriage, insurance, freight) prices, we decided to use one set of data consistently, viz. U.S. imports from India and U.S. exports to India and these are treated as Indian exports to U.S.A. and Indian imports from U.S.A. respectively. The discrepancy due to f.o.b.–c.i.f. differences will not play a very important role because we are interested in proportions of each sector's exports or imports to total exports or imports of the U.S.A.

There are three stages of computer analysis of data: (i) conversion of 81×81 coefficients matrix to transactions matrix, (ii) collapse of 81×81 transactions matrix to 8×8, 22×22 and 26×26 in deriving the Leontief inverse and capital, import and labour requirements per 1 million dollars of final demand in each sector. For the Indian economy, the same collapsing methods were used, and capital, import and labour requirements were worked out per 1 million rupees of final demand in each sector.

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APPENDIX 2

TABLE 1

DIRECT AND INDIRECT LABOUR, IMPORT AND CAPITAL REQUIREMENTS PER 1 MILLION DOLLARS AND FINAL DEMAND FOR U.S.A. AND PER 1 MILLION RUPEES OF FINAL DEMAND FOR EACH SECTOR FOR THE INDIAN ECONOMY

Sector No./ Country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million-dollars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
1. U.S.A.	Agriculture etc.	169	130	39	0.0397	0.0269	0.0129	1.1580	0.8665	0.2915
India	Agriculture etc.	1538(666) 260*	1520	18	0.0105	0.0003	0.0102	1.7200	1.5040	0.2160
2. U.S.A.	Mining	71	36	35	0.1049	0.0977	0.0072	0.8032	0.5820	0.2212
India	Mining	542(417) 400*	330	122	0.0117	0.0020	0.0097	3.2150	2.6590	0.5560
3. U.S.A.	Manufacturing	103	65	38	0.0517	0.0406	0.0111	1.1063	0.8918	0.2145
India	Manufacturing	654(470) 385*	290	364	0.0711	0.0476	0.0236	2.0870	1.1390	0.9480
4. U.S.A.	Construction	194	45	59	0.0232	0.0000	0.0232	0.7032	0.2057	0.4975
India	Construction	445(319) 261*	110	335	0.0271	0.0000	0.0271	2.4770	2.4040	1.0730
5. U.S.A.	Electricity etc.	72	26	46	0.0224	0.0044	0.0180	1.6378	1.4022	0.2356
India	Electricity etc.	127(118) 113*	50	77	0.0039	0.0000	0.0039	3.6060	2.6923	0.9140

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TABLE 1 (cont.)

Sector No./ Country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million-dollars)			Capital Requirements (million-dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
6. U.S.A.	Commerce	107	84	23	0.0069	0.0008	0.0061	0.3681	0.2161	0.1520
India	Commerce	120(120) 120*	120	0	0.0000	0.0000	0.0000	2.2710	0.2710	0.0000
7. U.S.A.	Transport and Communications	96	69	27	0.0418	0.0011	0.0407	0.4527	0.2049	0.1670
India	Transport and Communications	182(167) 159*	110	72	0.0203	0.0000	0.0203	2.7250	2.3240	0.4010
8. U.S.A.	Service (other)	132	103	29	0.0176	0.0056	0.0120	0.4596	0.2137	0.2459
India	Service (other)	129(123) 121*	110	19	0.0014	0.0000	0.0014	0.3830	2.3190	0.0640

*Denotes the estimates based on very low labour coefficient in agricultural sector of 200 man-years per 1 million rupees worth of gross domestic output in agricultural sector.

()Based on the intermediate estimate of 540 man-years per 1 million Rupees worth of output in the agricultural sector.

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TABLE 2

DIRECT AND INDIRECT LABOUR, IMPORTS AND CAPITAL REQUIREMENTS PER 1 MILLION DOLLARS OF FINAL DEMAND FOR U.S.A. PER 1 MILLION RUPEES OF FINAL DEMAND IN EACH SECTOR FOR THE INDIAN ECONOMY

Sector No./ country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million dollars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
1. U.S.A.	Agriculture, Forestry and Fishing	166	132	34	0.0419	0.0272	0.0147	1.1053	0.8799	0.2259
India	Agriculture, Forestry and Fishing	1524(657) 253*	1510	14	0.0124	0.0000	0.0123	1.6210	1.4980	0.1230
2. U.S.A.	Coal, Oil, Gas Mining	63	33	30	0.0819	0.0746	0.0073	0.7785	0.5770	0.2015
India	Coal, Oil, Gas Mining	437(406) 391*	340	97	0.0218	0.0101	0.0117	5.1230	2.6920	0.4310
3. U.S.A.	Other Mining	71	39	32	0.1718	0.1594	0.0123	0.8311	0.5907	0.2404
India	Other Mining	380(368) 362*	320	60	0.0296	0.0002	0.0295	2.8590	2.5840	0.2756
4. U.S.A.	Food, Beverages and Tobacco	114	29	85	0.0626	0.0392	0.0224	0.7207	0.1632	0.5525
India	Food, Beverages and Tobacco	1238(840) 1658*	490	748	0.0210	0.0047	0.0163	1.6670	0.5750	1.0920
5. U.S.A.	Textiles	127	67	60	0.0935	0.0736	0.0199	0.7089	0.2933	0.4156
India	Textiles	544(340) 245*	150	394	0.0583	0.0016	0.0567	1.3400	0.6600	0.6800
6. U.S.A.	Clothing	157	95	62	0.0979	0.0624	0.0356	0.4420	0.0898	0.3522
India	Clothing	957(547) 357*	160	797	0.0377	0.0001	0.0375	4.3210	2.8490	1.4720

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TABLE 2 (Cont.)

Sector No./ country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million dollars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
7. U.S.A.	Wood Products, Paper, Paint	113	75	56	0.0631	0.0497	0.0135	0.6211	0.3606	0.2605
India	Wood Products, Paper, Paint	453(381) 259*	180	275	0.1216	0.1019	0.0198	2.0410	1.3580	0.6836
8. U.S.A.	Rubber	91	45	46	0.0583	0.0351	0.0232	0.6054	0.2516	0.3538
India	Rubber	337(219) 164*	40	297	0.0623	0.0016	0.0607	1.5260	0.5450	0.9810
9. U.S.A.	Chemicals	75	33	42	0.0430	0.0212	0.0218	0.7854	0.4953	0.2901
India	Chemicals	217(164) 140*	30	187	0.1411	0.1078	0.0332	1.8670	1.1030	0.6740
10. U.S.A.	Petroleum and Coal Products	61	9	52	0.0835	0.0368	0.0467	0.6508	0.1027	0.5481
India	Petroleum and Coal Products	377(351) 339*	10	367	0.5719	0.0001	0.5717	1.1690	0.3100	0.8590
11. U.S.A.	Non-metallic Mineral Products	95	56	39	0.0440	0.0162	0.0278	0.8212	0.5007	0.3205
India	Non-metallic Mineral Products	343(327) 319*	250	93	0.0413	0.0221	0.0191	1.6520	0.9580	0.6940
12. U.S.A.	Ferrous and Nonferrous Metals	82	42	40	0.0895	0.0654	0.0241	0.7914	0.4864	0.3050
India	Ferrous and Nonferrous Metals	181(174) 171*	100	81	0.0664	0.0523	0.0141	3.2680	2.7070	0.5610

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13.	U.S.A.	Transport Equipment	88	38	50	0.0314	0.0542	0.0272	0.4884	0.1617	0.3267
	India	Transport Equipment	197(167) 155*	70	127	0.0763	0.0000	9.0763	3.5970	0.7550	0.8420
14.	U.S.A.	Machinery and Miscellaneous manufacture	98	62	36	0.0442	0.0199	0.0243	0.4067	0.2113	0.2754
	India	Machinery and Miscellaneous manufacture	440(413) 400*	300	140	0.0886	0.0118	0.0763	2.0580	0.7760	1.2820
15.	U.S.A.	Electricity, Gas, Water and Sanitation	74	26	48	0.0211	0.0005	0.0206	1.0889	0.7686	0.3203
	India	Electricity, Gas, Water and Sanitation	117(115) 111*	50	67	0.0089	0.0000	0.0089	3.1310	2.6930	0.4380
16.	U.S.A.	Construction	102	45	57	0.0254	0.0000	0.0254	0.8659	0.5208	0.3451
	India	Construction	345(265) 228*	110	235	0.0258	0.0000	0.0258	1.4370	0.5480	0.8890
17.	U.S.A.	Wholesale and Retail Trade	145	122	23	0.0747	0.0023	0.0724	0.3530	0.1943	0.1587
	India	Wholesale and Retail Trade	110(110) 110*	110	0	0.0000	0.0000	0.0000	0.5340	0.5340	0
18.	U.S.A.	Transport and Communication	93	69	24	0.0440	0.0362	0.0072	1.1160	0.9818	0.1342
	India	Transport and Communication	155(151) 149*	110	45	0.0314	0.0000	0.0314	2.5490	2.3220	0.2270
19.	U.S.A.	Restaurants, Hotels etc.	211	177	34	0.0117	0.0000	0.0117	0.5987	0.3462	0.2025
	India	Restaurants, Hotels etc.	110(110) 110*	110	0	0	0	0	0.5330	0.5330	0
20.	U.S.A.	Dwelling	0	0	0	0	0	0	0.2610	0.2610	0
	India	Dwelling	0	0	0	0	0	0	0.5330	0.5330	0
21.	U.S.A.	Electrical Machinery	98	26	72	0.0373	0.0158	0.0215	0.4655	0.1931	0.2724
	India	Electrical Machinery	195(179) 171*	60	135	0.1054	0.0141	0.0913	2.2320	0.9450	1.2870

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TABLE 2 (Cont.)

Sector No./ country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million dolllars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
22. U.S.A.	Transport Equipment	89	37	52	0.0333	0.0054	0.0279	0.4824	0.1616	0.3208
India	Transport Equipment	196(170) 157*	70	126	0.0781	0.0000	0.0781	1.7890	0.8380	0.9510
23. U.S.A.	Misc. Manufactures	93	58	35	0.0433	0.0273	0.0160	0.3509	0.1406	0.2103
India	Misc. Manufactures	550(451) 405*	270	280	0.0631	0.0024	0.0807	1.9850	0.5710	1.4140
24. U.S.A.	Electricity etc.	68	26	42	0.0183	0.0044	0.0139	1.0076	0.7643	0.2433
India	Electricity etc.	127(118) 113*	50	77	0.0106	0.0000	0.0106	3.2720	2.6950	0.5770
25. U.S.A.	Other Services	112	99	13	0.0159	0.0070	0.0089	0.5550	0.4532	0.1018
India	Other Services	182(159) 148*	120	62	0.0118	0.0000	0.0113	1.4510	1.2240	0.2270

* Denotes the estimates based on very low labour coefficient in agricultural sector of 200 man-years per 1 million Rupees worth of gross domestic output in the agricultural sector.

( ) Based on intermediate estimate of 540 man-years per 1 million Rupees worth of output in the agricultural sector.

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TABLE 3

DIRECT AND INDIRECT LABOUR, IMPORT AND CAPITAL REQUIREMENTS PER 1 MILLION DOLLARS OF FINAL DEMAND FOR U.S.A. AND PER 1 MILLION RUPEES OF FINAL DEMAND IN EACH SECTOR FOR THE INDIAN ECONOMY

Sector No./ country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million dollars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
1. U.SA.	Agriculture	169	132	37	0.0416	0.0272	0.0144	1.0990	0.8799	0.2194
India	Agriculture	1526(658) 233*	1510	16	0.0127	0.0907	0.0126	1.6540	1.4990	0.1550
2. U.S.A.	Coal Mining	101	71	30	0.0122	0.0090	0.0032	1.1610	0.9743	0.1867
India	Coal Mining	367(354) 348*	320	47	0.0181	0.0000	0.0181	2.8460	2.6040	0.2420
3. U.S.A.	Metal Mining	65	32	33	0.2551	0.2450	0.0101	1.1375	0.9325	0.2050
India	Metal Mining	524(367) 359*	320	14	0.0312	0.0000	9.0312	2.8230	2.5800	0.2430
4. U.S.A.	Crude Petroleum	62	26	36	0.0941	0.0879	0.0062	0.5339	0.3435	0.1904
India	Crude Petroleum	741(515) 498*	320	421	0.0504	0.0032	0.0471	3.3220	2.5840	0.7380
5. U.S.A.	Stone Quarrying	81	52	29	0.0693	0.0541	0.0152	1.0814	0.8327	0.2487
India	Stone Quarrying	320(380) 320*	320	0.0	0.0000	0.0000	0.0000	2.5800	2.5800	0.0000
6. U.S.A.	Other Non-metallic Mining	58	27	31	0.1442	0.1326	0.0116	1.0816	0.8599	0.2217
India	Other Non-metallic Mining	490(405) 150*	330	160	0.0433	0.0004	0.0429	3.6370	2.6350	1.0020
7. U.S.A.	Food. Beverages and Tobacco	115	29	86	0.0617	0.0391	0.0226	0.7037	0.1681	0.5456
India	Food, Beverages and Tobacco	1249(817) 660*	490	759	0.0233	0.0047	0.0186	1.9350	0.6900	1.2450

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TABLE 3 (Contd.)

Sector No./ country	Name of the sector	Labour Requirements (man-years)			Import Requirements (million doliars)			Capital Requirements (million dollars)		
		Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
8. U.S.A.	Textiles	125	68	57	0.0978	0.0735	0.0243	0.6831	0.2932	0.3899
India	Textiles	605(361) 247*	140	465	0.0686	0.0018	0.0668	0.9340	0.0730	0.8610
9. U.S.A.	Footwear and Clothing	156	94	62	0.0441	0.0033	0.0406	0.4297	0.0858	0.3459
India	Footwear and Clothing	219(206) 200*	120	39	0.0084	0.0000	0.0084	0.5570	0.4110	0.1460
10. U.S.A.	Leather, Fur Products	114	44	70	0.0984	0.0685	0.0298	0.5574	0.1056	0.4518
India	Leather, Fur Products	950(543) 354*	160	790	0.0375	0.0001	0.0374	1.8350	0.4050	1.4300
11. U.S.A.	Wood Products (excluding funitures)	138	89	49	0.1021	0.0837	0.0134	0.5447	0.2336	0.3111
India	Wood Products (excluding furniture)	544(408) 345*	280	264	0.0129	0.0003	0.0127	1.0320	0.5390	0.5430
12. U.S.A.	Furniture and Fixtures	140	76	64	0.0395	0.0002	0.0373	0.4568	0.0969	0.3599
India	Furniture and Fixtures	270(270) 270*	270	0.0	0.0000	0.0000	0.0000	0.6712	0.6710	0.0000
13. U.S.A.	Paper and Paper Products	90	47	43	0.1019	0.0845	0.0174	0.8522	0.6018	0.2504
India	Paper and Paper Products	486(274) 174*	20	466	0.1814	0.1404	0.0410	3.2600	2.0120	1.2480
14. U.S.A.	Printing	115	70	45	0.0262	0.0005	0.0257	0.5349	0.2225	0.3124
India	Printing	269(193) 158*	70	199	0.2801	0.0016	0.2715	1.4480	0.5610	0.8870

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15.	U.S.A.	Rubber	89	45	44	0.0647	0.0350	0.0297	0.5869	0.2510	0.3359
	India	Rubber	281(198) 159*	40	241	0.0547	0.0016	0.0531	1.4720	0.5430	0.9290
16.	U.S.A.	Chemicals	76	31	45	0.0461	0.0217	0.0344	0.7253	0.4097	0.3156
	India	Chemicals	241(160) 151*	30	211	0.1514	0.1152	0.0362	1.9830	1.2090	0.7750
17.	U.S.A.	Coal and Oil Products	66	15	51	0.0758	0.0307	0.0451	0.6228	0.2221	0.4007
	India	Coal and Oil Products	633(494) 429*	10	623	0.5797	0.0000	0.5797	1.2240	0.3100	0.9146
18.	U.S.A.	Other Non-metal Mineral Products	95	55	40	0.0360	0.0163	0.0197	0.8763	0.5030	0.3733
	India	Other Non-metal Mineral Products	336(318) 310*	250	86	0.0371	0.0199	0.0172	1.4790	0.8560	0.6230
19.	U.S.A.	Basic Metal Industry	64	43	41	0.0928	0.0657	0.0271	0.7961	0.4690	0.3071
	India	Basic Metal Industry	216(204) 198*	110	106	0.0822	0.0641	0.0181	3.6270	2.8690	0.9380
20.	U.S.A.	Metal Products	102	32	50	0.0473	0.0093	0.0380	0.5838	0.1905	0.3933
	India	Metal Products	150(141) 131*	60	90	0.0478	0.0067	0.0411	1.7850	0.6050	1.1800
21.	U.S.A.	Non-Electrical Machinery	102	55	47	0.0469	0.0203	0.0266	0.5331	0.2209	0.3122
	India	Non-Electrical Machinery	332(312) 303*	200	132	0.0128	0.0111	0.1017	2.0080	0.8680	1.1400
22.	U.S.A.	Financial Services	83	60	23	0.0120	0.0029	0.0091	0.4833	0.3121	0.1712
	India	Financial Services	110(110) 110*	110	0	0	0	0	0.5330	0.5330	0
23.	U.S.A.	Government Services	167	89	78	0.0464	0.0191	0.0273	0.8649	0.2674	0.5975
	India	Government Services	123(120) 118*	110	13	0.0017	0.0000	0.0017	0.6060	0.5450	0.0610

* Denotes the estimates based on very low labour coefficients in agricultural sector of 200 man-years per million Rupee worth of gross domestic output in the agricultural sector.

()Based on the intermediate estimate of 540 man-years per 1 million Rupees worth of output in the agricultural sector.

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TABLE 4

SOLUTION OF HOMOGENEOUS AND NON-HOMOGENEOUS PART OF THE DIFFERENCE/DIFFERENTIAL EQUATION AND EFFECTS OF EXPORT EXPANSION ON EMPLOYMENT (8 sectors)

Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net Exports[4]	Net Exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment Impact[8] (in man-years)	
									Version 1	Version 2
1. Agriculture	U.S.A. (m. dollars)	57473	0.3532 (2.8310)	0.3431	0.0194	0	0.0684	—	6.00	—
	India (m. rupees)	262830	0.2116 (4.7245)	2.3617	0.0467 (0.1178)	2.3058	10.70	16.16	1331	—
2. Mining	U.S.A. (m. dollars)	11843	0.3532 (2.8310)	8.0108	0.0021	0	0.0097	—	0.33	—
	India (m. rupees)	988	0.2116 (4.7245)	0.2861	0.0057 (0.0143)	0.2181	1.16	1.589	35	51.5
3. Manufacturing	U.S.A. (m. dollars)	119314	0.3532 (2.8310)	0.6461	0.0367	0	0.1428	—	5.32	—
	India (m. rupees)	126965	0.2116 (4.7245)	4.8522	0.0961 (0.2421)	4.5818	18.01	25.88	405	646
4. Construction	U.S.A. (m. dollars)	445498	0.3532 (2.8310)	0	0	0	0.0023	—	0.09	—
	India (m. rupees)	119462	0.2116 (4.7245)	0	0	0	0.3700	0.5194	2.50	4
5. Electricity etc.	U.S.A. (m. dollars)	1511	0.3532 (2.8310)	0	0	0	0.0030	—	—	—
	India (m. rupees)	1314	0.2116 (4.7245)	0	0	0	0.5200	0.7548	2.50	4

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6. Commerce	U.S.A. (m. dollars)	549227	0.3532 (2.8310)	0	0	0	0.0164	—	1.23	—
	India (m. rupees)	0	0.2116 (4.7245)	0	0	0	0.0130	0.0	0	0
7. Transport and Communications	U.S.A. (m. dollars)	136115	0.3532 (2.8310)	0	—	0	0.0071	—	0.44	—
	India (m. rupees)	7153	0.2116 (4.7245)	0	—	0	0.0710	1.036	15	24
8. Services	U.S.A. (m. dollars)	140650	0.3532 (2.8310)	0	—	—	0.0099	—	1.00	—
	India (m. rupees)	8651	0.2116 (4.7245)	0	—	—	2.6400	3.7900	60	—

Footnotes 1 to 8 are shown after table 6.

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TABLE 5

SOLUTION OF HOMOGENEOUS AND NON-HOMOGENEOUS PART OF THE DIFFERENCE/DIFFERENTIAL EQUATION AND EFFECTS OF EXPORTS ON EMPLOYMENT (22 sectors)

Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net exports[4]	Net exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment Impact[8] (man-years)	
									Version 1	Version 2
1. Agriculture, Forestry and Fishing	U.S.A. (m. dollars)	57473	0.4914 (2.0350)	0.3420	0.0194	—	0.0632	—	5.54	—
	India (m. rupees)	262830	0.2011 (4.9720)	2.3617	0.0467 (0.1176)	2.2266	10.86	16.23	1353	2081
2. Coal, Oil and Gas Mining	U.S.A. (m. dollars)	30024	0.4914 (2.0350)	0.0	0.0	—	0.0024	—	0.08	—
	India (m. rupees)	328	0.2011 (4.9720)	0.0001	0.0 (0.0)	0.0	0.11	0.1790	0.50	7.50
3. Other Mining	U.S.A. (m. dollars)	47574	0.4914 (2.0350)	0.0108	0.0006	—	0.0043	—	0.16	—
	India (m. rupees)	556	0.2011 (4.9720)	0.2860	0.0057 (0.0143)	0.2808	0.8200	1.2410	25	40
4. Food, Beverages and Tobacco	U.S.A. (m. dollars)	1595468	0.4914 (2.0350)	0.0571	0.0032	—	0.0136	—	0.31	—
	India (m. rupees)	2198300	0.2011 (4.9720)	0.3161	0.0063 (0.0158)	0.3097	1.0300	1.4960	48	75
5. Textiles	U.S.A. (m. dollars)	1216382	0.4914 (2.0350)	0.0028	0.0001	—	0.0051	—	0.21	—
	India (m. rupees)	73924	0.2011 (4.9720)	3.5105	0.0695 (0.1751)	3.5047	10.20	14.9490	233	344

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6. Clothing	*U.S.A.*	*15790845*	0.4914	0.0292	0.0016	—	0.0042	—	0.32	—
	(m. dollars)		(2.0350)							
	India	67094	0.2011	0.3080	0.0061	0.3080	1.20	1.2560	20	32
	(m. rupees)		(4.9720)		(0.0154)					
7. Wood Products Paper and Paints	U.S.A.	335389	0.4914	0.0014	0.0001	—	0.0055	—	0.20	—
	(m. dollars)		(2.0350)							
	India	32326	0.2011	0.0404	0.0008	0.0299	0.24	0.3460	7.50	11
	(m. rupees)		(4.9720)		(0.0020)					
8. Rubber	U.S.A.	291340	0.4914	0.1610	0.0091	—	0.0207	—	1.00	—
	(m. dollars)		(2.0350)							
	India	153913	0.2011	0.0081	0.0002	0.0080	0.1500	0.2180	9	0
	(m. rupees)		(4.9720)		(0.0005)					
9. Chemicals	U.S.A.	163918	0.4914	0.0201	0.0011	—	0.0145	—	0.36	—
	(m. dollars)		(2.0350)							
	India	30586	0.2011	0.0762	0.0015	—	1.5300	2.1230	10	15
	(m. rupees)		(4.9720)		(0.0038)					
10. Petroleum and Coal Products	U.S.A.	428008	0.4914	0.0024	0.0001	—	0.0033	—	0.03	—
	(m. dollars)		(2.0350)							
	India	28794	0.2011	0.0068	0.0001	0.0339	0.1100	0.2045	0	0
	(m. rupees)		(4.9720)							
11. Non-metallic Mineral Products	U.S.A.	103081	0.4914	0.1512	0.0086	—	0.0206	—	1.02	—
	(m. dollars)		(2.0350)							
	India	39674	0.2011	0.0265	0.0005	0.0188	0.2300	0.3460	10	16
	(m. rupees)		(4.9720)		(0.0012)					
12. Ferrous and Non-ferrous metals	U.S.A.	164377	0.4914	0.0617	0.0035	—	0.0161	—	0.48	—
	(m. dollars)		(2.0350)							
	India	191	0.2011	0.3316	0.0066	0.2884	0.5250	2.0819	8	38
	(m. rupees)		(4.9720)		(0.0166)					

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TABLE 5 (Cont.)

Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net exports[4]	Net exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment impact[8] (man-years) Version 1	Version 2
13. Transport Equipment	U.S.A. (m. dollars)	2096319	0.4914 (2.0350)	0.1572	0.0089	—	0.0253	—	0.70	—
	India (m. rupees)	107802	0.2011 (4.9720)	0.0067	0.0001 (0.0002)	0.0067	0.0540	0.0890	2	2
14. Machinery and Misc. Manufactures	U.S.A. (m. dollars)	871066	4.4914 (2.0350)	0.0	0.0	0	0.0108	—	0.50	—
	India (m. rupees)	10742	0.2011 (4.9720)	0.2211	0.0044 (0.0110)	0.2161	1.1030	1.6180	200	313
15. Electricity, Gas, Water and Sanitation	U.S.A. (m. dollars)	40289	0.4914 (2.0350)	0.0	0.0	—	0.0036	—	0.08	—
	India (m. rupees)	999	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.4600	0.7090	2.5	4
16. Construction	U.S.A. (m. dollars)	145510	0.4914 (2.0350)	0.0	0.0	—	0.0023	—	0.10	—
	India (m. rupees)	321849	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.3200	0.4910	2.5	7
17. Wholesale and Retail Trade	U.S.A. (m. dollars)	853595	0.4914 (2.0350)	0.0	0.0	—	0.0080	—	0.82	—
	India (m. rupees)	0	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.0000	0.0	0	0
18. Transport and Communication	U.S.A. (m. dollars)	5706	0.4914 (2.0350)	0.0	0.0	—	0.0075	—	0.46	—
	India (m. rupees)	3194	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.5360	0.8370	12.5	7

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19. Restaurants, Hotels etc.	*U.S.A. (m. dollars)*	*450733*	*0.4914 (2.0350)*	*0.0*	*0.0*	*—*	*0.0003*	*—*	*0.06*	*—*	
	India (m. rupees)	0	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.00	0	—	0	
20. Dwelling	U.S.A. (m. dollars)	0	0.4914 (2.0350)	0.0	0.0	—	0.0	—	0.0	—	
	India (m. rupees)	0	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.00	0.0	0.0	0.0	
21. Financial Services	U.S.A. (m. dollars)	288875	0.4914 (2.0350)	0.0	0.0	—	0.0162	—	0.82	—	
	India (m. rupees)	0	0.2011 (4.9720)	0.0	0.0 (0.0)	—	0.0	0	—	0	
22. Government Services	U.S.A. (m. dollars)	72335	0.4914 (2.0350)	0.0	0.0	—	0.0021	—	0.18	—	
	India (m. rupees)	86998	0.2011 (4.9720)	0.0	0.0 (0.0)	—	1.9190	2.9450	2.5	4	

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TABLE 6

SOLUTION OF HOMOGENOUS AND NON-HOMOGENOUS PART OF THE DIFFERENCE/DIFFERENTIAL EQUATION AND EFFECTS OF EXPORT EXPANSION ON EMPLOYMENT (26 Sectors)

	Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net exports[4]	Net exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment Impact[8] (man-years)	
										Version 1	Version 2
1.	Agriculture	U.S.A. (m. dollars)	57473	0.5075 (1.9704)	0.3432	0.0195	—	0.0637	—	5.6	—
		India (m. rupees)	262830	0.1887 (5.2990)	2.3617	0.0467 (0.1176)	2.2050	11.06	15.948	1380	2025
2.	Coal Mining	U.S.A. (m. dollars)	379	0.5075 (1.9704)	0	0.0	—	0.0008	—	0.0	—
		India (m. rupees)	761	0.1887 (5.2990)	0.0001	0.0 (0.0)	0.0001	0.1380	0.1977	5	8
3.	Metal Mining	U.S.A. (m. dollars)	1990	0.5075 (1.9704)	0	0.0	—	0.0021	—	0.0	—
		India (m. rupeee)	445	0.1887 (5.2990)	0.0355	0.0007 (0.0017)	0.0355	0.0190	0.1740	2	4
4.	Crude Petroleum	U.S.A. (m. dollars)	65462	0.5075 (1.9704)	0.0	0.0	—	0.0302	—	0.0	—
		India (m. rupees)	341	0.1887 (5.2990)	0.0	0.0 (0.0)	0.0298	0.0350	0.0329	0.0	0.0
5.	Stone Quarrying	U.S.A. (m. dollars)	7188	0.5075 (1.9704)	0.0001	0.00	—	0.0004	—	0.0	—
		India (m. rupees)	0	0.1887 (5.2990)	0.0086	0.0001 (0.0002)	0.0086	0.0220	0.0344	0.0	—

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6. *Other non-Metallic Mining*	U.S.A. (m. dollars)	4768	0.5075 (1.9704)	0.0107	0.0006	—	0.0018	—	0.0	—	
	India (m. rupees)	389	0.1887 (5.2990)	0.2418	0.0048 (0.0121)	0.2357	0.7990	1.1530	25	32	
7. Food, Beverages and Tobacco	U.S.A. (m. dollars)	2331411	0.5075 (1.9704)	0.0571	0.0032	—	0.0138	—	0.30	—	
	India (m. rupees)	1847946	0.1887 (5.2990)	0.3161	0.0063 (0.0158)	0.3091	1.0200	1.4810	65	96	
8. Textiles	U.S.A. (m. dollars)	44816	0.5075 (1.9704)	0.0028	0.0001	—	0.0015	—	0.06	—	
	India (m. rupees)	735132	0.1887 (5.2990)	3.5105	0.0695 (0.1751)	—	10.044	14.7090	175	264	
9. Footwear and Clothing	U.S.A. (m. dollars)	15325714	0.5075 (1.9704)	0.0020	0.0001	—	0.0004	—	0.03	—	
	India (m. rupees)	79602	0.1887 (5.2990)	0.1790	0.0035 (0.0088)	0.1789	0.7650	0.9837	12	20	
10. Leather, Fur Products	U.S.A. (m. dollars)	3223333	0.5075 (1.9704)	0	0.000	—	0.0001	—	0.0	—	
	India (m. rupees)	7995416	0.1887 (5.2990)	0.1291	0.0025 (0.0063)	0.1291	0.358	0.528	2.5	4	
11. Wood Products (incl. furniture)	U.S.A. (m. dollars)	215321	0.5075 (1.9704)	0.0217	0.0012	—	0.0048	—	0.28	—	
	India (m. rupees)	253457	0.1887 (5.2990)	0.0231	0.0004 (0.0010)	0.0231	0.0987	0.1101	2.6	4	
12. Furniture and Fixtures	U.S.A. (m. dollars)	4375456	0.5075 (1.9704)	0.0	0.0	—	0.0001	—	0.0	—	
	India (m. rupees)	0	0.1887 (5.2990)	0.0058	0.0001 (0.0002)	0.0058	0.0150	0.0232	0.0	0.0	

TABLE 6 (Contd.)

	Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net exports[4]	Net exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment impact[8] (man-years) Version 1	Employment impact[8] (man-years) Version 2
13.	Paper and Paper Products	U.S.A. (m. dollars)	84355	0.5075 (1.9704)	0.0034	0.0002	—	0.0033	—	0.0	—
		India (m. rupees)	9264	0.1887 (5.2990)	0.0022	0.000 (0.000)	−0.0113	0.065	0.0746	0	0
14.	Printing	U.S.A. (m. dollars)	460492	0.5075 (1.9704)	0.0048	0.0003	—	0.0016	—	0.0	—
		India (m. rupees)	59093	0.1887 (5.2990)	0.0088	0.0002 (0.0005)	0.0086	0.083	0.1205	0.0	0.0
15.	Rubber	U.S.A. (m. dollars)	142275	0.5075 (1.9704)	0.0014	0.0001	—	0.0018	—	0.0	—
		India (m. rupees)	3333333	0.1897 (5.2990)	0.0081	0.0001 (0.0002)	0.0080	0.082	0.1210	0.0	0.0
16.	Chemicals	U.S.A. (m. dollars)	97311	0.5075 (1.9704)	0.1597	0.0091	—	0.0275	—	0.66	—
		India (m. rupees)	41154	0.1887 (5.2990)	0.0754	0.0015 (0.0038)	−0.0334	1.6710	2.2313	12.50	13
17.	Coal and Oil Products	U.S.A. (m. dollars)	253666	0.5075 (1.9704)	0.0209	0.0012	—	0.0076	—	0.10	—
		India (m. rupees)	49158	0.1887 (5.2990)	0.0080	0.0001 (0.0002)	0.0054	0.1290	0.1830	0	0
18.	Other Non-metal Mineral products	U.S.A. (m. dollars)	72209	0.5075 (1.9704)	0.0024	0.0001	—	0.0019	—	0.10	—
		India (m. rupees)	31899	0.1887 (5.2990)	0.0265	0.0005 (0.0007)	0.0018	0.3040	0.3961	12.5	13.50

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19.	*Basic Metal Industry*	U.S.A. (m. dollars)	73749	0.5075 (1.9704)	0.1513	0.0086	—	0.0324	—	0.98	—
		India (m. rupees)	1415	0.1887 (5.2990)	0.3316	0.0066 (0.0166)	0.2905	1.5730	2.220	25	36
20.	Metal Products	U.S.A. (m. dollars)	330884	0.5075 (1.9704)	0.0043	0.0002	—	0.0053	—	0.24	—
		India (m. rupees)	201009	0.1887 (5.2990)	0.1207	0.0024 (0.0060)	0.1187	0.7450	1.0914	7.5	11.5
21.	Non-Electrical Machinery	U.S.A. (m. dollars)	152540	0.5075 (1.9704)	0.0911	0.0052	—	0.0148	—	0.66	—
		India (m. rupees)	105443	0.1887 (5.2990)	0.0093	0.0002 (0.0005)	0.0086	0.0663	0.0948	0	0
22.	Electrical Machinery	U.S.A. (m. dollars)	775004	0.5075 (1.9704)	0.0435	0.0075	—	0.0088	—	0.38	—
		India (m. rupees)	119816	0.1887 (5.2990)	0.0069	0.0001 (0.0002)	0.0060	0.0669	0.0956	0	0
23.	Transport Equipment	U.S.A. (m. dollars)	2326865	0.5075 (1.9704)	0.0617	0.0035	—	0.0111	—	0.30	—
		India (m. rupees)	296376	0.1887 (5.2990)	0.0067	0.0001 (0.0002)	0.0067	0.0551	0.082	2.5	4
24.	Miscell. Manufactures	U.S.A. (m. dollars)	937760	0.5075 (1.9704)	0.0191	0.0010	—	0.0037	—	0.20	—
		India (m. rupees)	151855	0.1887 (5.2990)	0.0841	0.0016 (0.0040)	0.0838	0.2519	0.3730	40	64
25.	Electricity etc.	U.S.A. (m. dollars)	19076	0.5075 (1.9704)	0.0	0.0	—	0.0037	—	0.08	—
		India (m. rupees)	1882	0.1887 (5.2990)	0.0	0.0 (0.0)	0.0	0.5227	0.788	2.5	4

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TABLE 6 (Cont.)

	Name of the sector	Name of the country	Constant term by sectors[1]	Growth rate and Frobenius root[2]	Exports in the initial period[3]	Net exports[4]	Net exports[5]	Constant for the particular part[6]	Constant for the particular part[7]	Employment impact[8] (man-years) Version 1	Version 2
26.	Other Services	U.S.A. (m. dollars)	208576	0.5075 (1.9704)	0.0	0.0	—	0.0370	—	2.72	—
		India (m. rupees)	44457	0.1887 (5.2990)	0.0	0.0 (0.0)	0.0	3.3684	4.8350	5.0	169

[1]The constant term for the homogenous system is derived by expressing the elements of the characteristic vector as a ratio of the first element. For the sector 1, the initial value of the output becomes the value of the constant.

[2]First, the Frobenius root of a matrix is determined and the reciprocal of the Frobenius root is defined as the growth rate. This yields balanced growth rate (maximal with market equilibrium) and corresponding to the Frobenius root, the vector is recovered and normalized as mentioned in (1).

[3]The exports in the first round for India are the actual imports by U.S.A. from India. These are expressed in proportion to total exports and have been converted to Rupees by using the exchange rate \$1.00 = 7.50 Rs. Exports in the first round for U.S.A. are actual exports by U.S.A. to India and these are expressed as proportions to total exports.

[4]These exports bear the impact of foreign exchange. For India, the additional foreign exchange is partely spent on U.S. goods which increased India's productive capacity and in turn increases India's exports to U.S.A. and to the Rest of the World. India's exports to U.S.A. are given by $[NE_{i1}] = 0.0161\ [E_i]$ and to the Rest of the World are given by $[NE_{i2}] = 0.0405$ which U.S. exports to India are given by $0.0568[E_i]$. Bracketed figures in this column refer to the exports from India to the Rest of the World.

[5]This is the second version of the model in which net exports are derived by netting out import requirements of exports. $\{I - [M][I - D]^{-1}\}[E_i]$ yields net exports for India and as there is no foreign exchange impact in this model, no imports are generated by India from U.S.A.

[6]For the particular solution, the vector $[V] = \frac{[I - D]^{-1}[E_i + NE_{i1}]}{(1 - \alpha_1 + \alpha_3)} + \frac{[I - D]^{-1}[NE_{i2}]}{(1 - \alpha_1 + \alpha_3)}$ for India while for U.S.A. $[V] = \frac{[I - D]^{-1}[NE_i]}{1 - \alpha_1' + \alpha_3'}$ can be added to the homogenous part before the constants are determined. The constants need to be reworked for the exact solution but since constants change by less than 1 per cent we have not incorporated this corrective adjustment.

[7]For the particular solution, the vector $[V] = \frac{[I - D]^{-1}[E_i]}{(1 - \alpha_1 + \alpha_3)} + \frac{(\alpha_1 - \alpha_3)[I - D]^{-1}[NE_i]}{(1 - \alpha_1 + \alpha_3)}$ is given for India.

[8]Employment for the first and second version are derived as follows:
(a) For U.S.A. $[1X^{d-1}][I - D]^{-1}[NE_i] \times (2)$ and for India $[1X^{d-1}][I - D]^{-1}[E_i + NE_{i1} + NE_{i2}] \times (2.5)$
and (b) For India $[1X^{d-1}][I - D]^{-1}[E_i] \times (2.5) + [1X^{d-1}][I - D]^{-1}[NE_i] \times (1.5)$.

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EXPORT-LED VERSUS BALANCED GROWTH IN THE 1980s

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Introduction

The experience of the 1970s really vindicated the export optimists. Following Bela Balassa, it was observed that the economic growth seems to have been closely related to export performance. The inspiration for the "balanced import substituting" growth came not from the export pessimism, but from the fact that the LDCs were simply left with no other option to hasten the pace of their industrialization.

The present plight of the LDCs is the result of various adverse changes in the external environment since early 1970s. Vigorous pursuit of import substitution policies led to the movement of resources from agriculture and mining into various elite sectors and this shift over time led to a domestic market bias due to its discrimination against exports. Hence a strong case was made for subsidizing the production of manufacturers.

While countries like Argentina, Brazil, Egypt, India and Pakistan pursued import substitution policy in the 1960s, other smaller NICS (Israel, Korea, Hong Kong, Taiwan and Singapore) shifted to export-led model. Looking back, it can be said that perhaps the structure of economy, more than the views of the policy makers, may be identified as an important determinant of the extent to which import substitution was actively pursued.[1]

Two global recessions in the OECD countries in the 1970s led to slow-down in the world trade pattern and this affected the ability of the LDCs to import due to various terms of trade effects despite such adverse conditions in the world economy, the LDCs have pursued vigorous industrialization in the 1970s.

Now in the 1980s, there is an urgent need for looking afresh at the possibility of their reliance on export-led growth. A. Lewis analysed the consequences of a slow-down of the engine of growth in the LDCs and also suggested a strategy to revive it. To Lewis, the engine is trade, which in the past was fuelled by industrial growth in the North. The only way now left for the LDCs lies in trade among the LDCs which can "take-

[1]See here R. Ballance, Ansari and Singer, *The International Economy and Industrial Development*, Wheatsheaf books, London, 1982, p. 42.

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up the slack left by MDCs (more developed countries), as MDCs slow down.[2]

The pessimism about demand for LDCs' export was underlined by Prebisch Singer and Nurkse. The Lewis model is identical with the one Nurkse held in the 1950s for trade as a faltering engine of growth. Later Krovis showed that export growth did not serve in the 19th century to differentiate the successful from the unsuccessful countries.[3]

Lewis now draws attention to two features: (1) that the coefficient linking Primary Commodity trade with Industrial production in the DCs as consistently being less than unity (he put it at 0.87) and (ii) that the expected cyclical favourable effects in terms of trade of primary exporters from high levels of activities in the DCs did not happen this time.

Long back Singer argued that the historical downward trend in terms of trade for primary goods from 1870s to 1939, was due to 'general' forces and nature of relations within and between industrial countries and the LDCs.[4]

Now Lewis also, like Nurkse, makes an appeal for a new strategy of development on the basis of declining demand for LDCs, exports in the developed North. Lewis attributes the decline of demand mainly to reduction in the growth rate and the general level of expenditure in developed countries. The case here is less tied to LDCs' specialization in primary goods and avoids the issue of substitutability between LDCs export and domestically produced goods. Lewis like Nurkse, does not underline the price effects. The main link between DCs and LDCs has been the DCs' demand for LDCs' primary goods. This has been a link in terms of physical volume, not much affected by price.

Hence the growth model of Lewis and Nurkse locates the global engine of growth solely in the North. Recently Taylor developed a short-term model with reciprocal dependence that provides a detailed look at North-South relations. His plea is for a larger dose of autarky for the non-oil exporting LDCs.[5]

The Engine of Growth

There has been a lot of controversy about who is the engine of growth for whom. We find that terms of trade and relative prices are crucial in the linkages between physical volume of output in the North and exports and output in the LDCs.

The Brandt Report is based on the picture that during the 1950s and

[2]W. A. Lewis, "The Slowing Down of the Engine of Growth", *American Economic Review*, Sept. 1980, p. 556.

[3]I. B. Kravis, *Economic Journal*, 1970, p. 850.

[4]UN. *Relative Prices of Exports and Imports of Underdeveloped Countries*, 1949.

[5]Lance Taylor, "South-North Trade and Southern Growth, Bleak prospects from structuralist point of view", *Journal of International Economics*, 1982.

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1960s the industrial countries were the engine of growth for the LDCs. It visualizes a future where these roles could be reversed. Recently, Singer suggested that the LDCs, even during the 1950s and 60s, by providing developed countries with steady supplies of primary goods, simple manufactures and labour, on terms increasingly favourable to the industrial countries, were an engine of growth for these countries throughout the 25 golden years after the end of the war.[6]

The thesis of declining terms of trade touches raw nerves and rouses strong resistance. Hence there has been emphasis on changing quality of manufactures, new commodities, falling transport cost, factoral terms of trade. As Streeten put it recently: "While many of the criticisms of the doctrine that the terms of trade of Primary Producers steadily deteriorate, appear to be damaging the core of the doctrine may well survive the onslaughts. This case is that in the world economy, there are forces at work that make for uneven distribution of gains from trade and economic progress so that the lions-share goes to the lions while the poor lambs are themselves swallowed up in the process".[7]

Export-led Growth in the 1980s

While various studies[8] tested the hypothesis of the relationship between exports and growth through the study of correlation between export and growth, Michaely tested the relationship in a different way.[9] He argued that the method adopted earlier by correlating growth measured by the change in national product (total as per capita) with the change in exports is a wrong one, because exports are themselves a part of the national product.

We find that growth in foreign demand is equally important as a source of output growth of various capital goods. But the fact remains that in the manufacturing sector in the LDCs, the ratio of exports to gross output was observed in the range of 6 to 10 per cent.

Looking at the prospects to attain the Lima target which stipulated that industrial production in the LDCs should rise from 7 p.c. of 1975 world industrial production to 25 p.c. by the year 2000, Singer held that an export-led strategy was not likely to accomplish these goals.[10] He pleaded

[6]H. Singer, *The Terms of Trade Controversy and the Evolution of Soft Financing.* Early years in the U.N., World Bank, 1982, p. 19.

[7]P. Streeten, *Development Perspectives*, 1981, p. 217.

[8]See here, R. F. Emergy, "The relation of exports and growth", Kyklos, 1967.

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[9]M. Michaely, "Exports and Growth : an empirical investigation", *Journal of Development Economics*, March 1977.

[10]H. Singer, "Policy implications of the Lima target", *Industry and Development*, 1979, pp. 17–32.

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for an alternative approach called a "balanced growth" approach of basing national development on agriculture as primary sector and developing industries with a strong emphasis on agriculture–industry linkages and interaction.

We also find that the input-output based decomposition calculations of sources of growth by Chenary and others in the 1960s lend support to the hypothesis that internal demand changes are an important source of growth. In the study of sources of industrial growth in Japan, from 1914–1965, Chenary and Watanabe[11] found that the demand effects accounted for 58 p.c. trade effects for 15 p.c. and technical change for 26 p.c. of growth over this period, Japanese industrial production rose from 17 p.c. of GNP to 47 p.c. The GNP increased by a factor of 50 p.c. and industrial production increased by a factor of 20 p.c.

The Efficiency Case for Export Growth

Looking back at the performance of the Indian economy in the 1970s, we can say that the neo-classical case has been proved wrong in terms of growth of various macro-variables like savings, investments and technical progress. In the 1960s, the case for export growth on the lines of dynamic comparative advantage was made by Prof. Bhagwati-Desai, and Srinivasan. Various elements of liberalization package were also worked out. The allocational efficiency case based on ERP and DRC measures was related to long-run growth prospects of the LDCs.

Then a causal link was also established between allocative efficiency, export growth and GDP, growth rates in the individual exporting countries.[12] We find that this hypothesis had a powerful impact on government policy in the 1960s. We are also concerned about the new belief that the inability of the economy to generate an adequate volume of investible surplus can be overcome through a process of export-led growth. Really in the short-run a poor country fails to generate an investible surplus for reasons similar to those which prevented her from generating an exportable surplus.

In the NBER project, Bhagwati, Krueger define trade liberalization as a process of moving away from quota restrictions at disequilibrium exchange rate to one where only tariffs are used at equilibrium exchange rate. In these studies "static" efficiency is evaluated on the basis of the effects of production on resource allocation, capacity utilization and inventory holdings. One conclusion here is that various dynamic losses reinforce rather than offset, the static losses. Also an empirical relationship is established between some measure of efficiency e.g. marginal capital-

[11]Chenery, H. B. and Watanabe, S. S., "The role of industrialization in Japanese Development 1914–1965", 1976 (Unpublished).

[12]See here Bhagwati and Krueger, *op. cit.*

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output ratio, total factor productivity and the extent of restrictiveness in trade regime where an inverse statistical relationship is found.

While Bhagwati cautions that the exchange controls merely support industrial licencing policy arrived at 'a priori', there is sufficient flexibility in the system for trade policies to influence resource allocation through operation of price incentives. Moreover a concept of "export bias" index is used to find out the elasticity of exports to prices.

In these studies ratio of effective exchange rate on exports (EERX) to that on imports (EERM) is defined as the index of bias against exports. The export bias index that is less than one captures in a $2 \times 2 \times 2$ model, the impact of a relative price change between exportables on the composition and volume of production and trade.

In the light of the above results, export promoting policies are superior to import substituting, because under the former regime, the incentives are likely to be more "neutral" among industries as export subsidies are an open cost in national budgets. Also the export promoting policies remove various disadvantages as excess capacity, excess inventories and supply bottlenecks in case of import-substituting policies.

Krueger has elaborate data showing that export activities are much more intensive in unskilled labour than in industries based on import substitution. Krueger also shows that the import substituting industries utilised more skilled labour than do the export activity.[13] The message here is that the government should keep the effective exchange rate (inclusive of QR premia) as seen by importers and exporters so that the bias is eliminated.

Immediately after phase III devaluation and liberalization, the bias against exports was sharply reduced in several cases. Bhagwati-Krueger classify 9 out of 22 phase III cases as successful. Really these successes were not sustained in the face of continuing inflationary pressures. Bhagwati also held that one consequence of import substituting policy is the attempt to remove bias against export by giving subsidy. But Stalin gave sufficient evidence of wide spread non-discriminatory export subsidies.[14] Hence across-the-board tariffs are suggested which could be superior to phase II type exchange rate over-valuation and QRS.

We find that the analysis of NBER project does not provide any firm conclusions on the overall superiority of export-promoting over import substituting policies. When deciding the policy framework, the behaviour of the rest of the world also be considered. Even the case for trade liberalization in terms of removing distortions is not so robust, because in a less than perfect world, the LDCs cannot restore equilibrium with the help of policy variables.

[13]A. D. Krueger, *Liberalization attempts and Consequences* (NBCR), 1978.

[14]C. P. Stalin, *Export Promotion in the LDCs: Case Study of India*, University of Michigan, 1971.

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Krueger study also showed that a one p.c. rise in export growth rate could explain 0.1 p.c. rise in GDP growth rate. For a similar growth rate of exports, 1.6 p.c. of growth rate in GDP could be explained under liberalized regime, but the explanatory power of the variable was observed to come down to 0.8 p.c. with strict controls in the domestic economy. The predictive value of regression results here for the causal links established between export incentives, export growth and GDP growth rates is also reduced. The results depend on pooling of cross country and time-series data for various countries and various assumptions e.g. choice of the same base year to deflate GNP in different countries are introduced to reduce problems of heterogeneity in the data.

In the cross-country data, there are also problems of international comparisons of purchasing power. Another unrealistic assumption observed in these models was that the domestic or international demand never works as a constraint on the possible growth of efficient units and the thesis depends on Say's Law, ruling out long-run unemployment. It seems that the efficiency gains and export growth are treated as more immediate goals of liberal regimes. But the Indian experience in the 1970s highlighted different scenarios that require different sets of hypotheses and policy variables.

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A NOTE ON POSTWAR GROWTH OF INDUSTRY AND AGRICULTURE IN YUGOSLAVIA

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The Institutional Setting

The post-war economic development of Yugoslavia is characterised with evolution of a new economic system based on social ownership and control of the means of production, with workers' self-management and the decentralization of political and economic decision making. As a corollary, there has been a greater reliance on market as a guide to allocation of resources and reduction of central planning and administrative control. Throughout, an attempt has been made to translate the notion of a self-managed socialist democracy into reality and the evolution is far from being complete. The process has been marked by discontinuities as periods of rapid growth have been followed by periods of consolidation and stability of economic growth. Over the entire period (1952–1986) increased economic efficiency has been one of the basic objectives of the process of institutional changes (1965, 1971, 1982, 1987). The progress has been accompanied with an increased opening up of the economy, freer foreign exchange and trade system, and rising standards of living.

The Economic Performance

Practically throughout the entire period of socialist development the tempo of economic growth, with the exception of 1980–1985, has considerably been fast and continuous. Yugoslavia ranks among the countries that have recorded the fastest growth after the war.

Postwar economic performance has been characterised by record growth rates in industry and modest rate in agriculture although with great oscillations. The real social product has increased by 5.3 per cent and per capita incomes by 4.4 per cent. This has been followed by rapid structural changes, a fairly high rate of employment growth and a steady rise of standards of living, and with a high coefficient of foreign trade keeping in mind the size of national income. An exceptionally high rate of investment and domestic accumulation has been maintained.

The development strategy has greatly relied on industrial expansion based on high investment ratio. The fixed assets per capita increased at 4.1 per cent and the capital coefficients have shown a tendency to rise in industry particularly. While the trends in these ratios are not necessarily a reliable index of the efficiency of resource allocation in the country, but

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they do imply to mean a reduction in employment and growth effects.

The dynamics of development has been different in particular periods resulting into different consequences, while extensive development has been achieved during 1953–1965. The social product increased at an annual rate of 8.1 per cent, industrial production at 12 per cent, agricultural production at 4.7 and personal incomes at 5.3 per cent. The foreign indebtedness was lower and exports increased faster than the imports. The slower growth of personal incomes against the national income strengthened the accumulation to which agriculture also contributed immensely. The basic industry has been constructed that provided the base for processing industry. The relatively lower increase in prices at 5.8 per cent reflects the stability of growth in that period.

The period 1966–1979 registers a lesser rate of 6 per cent increase in the social product. But this period is significant for far-reaching structural and socio-economic changes. Besides, the economic reforms, and constitutional changes, a freer role of market and lesser administrative control over income of enterprises, a liberal and complex system of social planning, constant deficit of balance of trade, accompanied by increase in all forms of consumption above the attained level of social product have been the main features of the development. A fall in the domestic accumulation with a high rate of investment in fixed assets (above 30 per cent) greatly increased the foreign indebtedness. The neglect in use of domestic resources resulted in increased imports of energy and raw materials. Inflation increased by 10–18 per cent per year. Furthermore, the high volume of investments has not been well utilised as it was not accompanied by expansion of exports which could ease the debt repayments abroad. Over and above this, unemployment increased.

The period between 1980–1986 could be termed as that of slowing down of the engine of growth and excessively high inflation. The social product increased only at a rate of 0.7 per cent which with a net increase in population by 0.8 per cent means nothing but stagnation of the growth. Here the growth potentialities seem to have exhausted, particularly due to the inflationary finance through foreign debt. The changing strategy of extensive to intensive growth had resulted in economic difficulties at home and abroad. This has been aggravated by the existing autocratic orientation of development perspective by the enterprises and socio-political communities, and in domestic and international markets. Structural disproportions, excessive domestic consumption, slower progress in self-management relations has resulted into unstable and unbalanced economic trends, stagnation of production, high rate of inflation, and deterioration in external liquidity. During this period industrial production had risen only by 2.7 per cent and agricultural production by 0.6 per cent. Retail prices shot up by 45 per cent per year. Real average personal incomes decreased annually by 5.2 per cent. Exports grew at slower rate and

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the value of dinar has been decreasing rapidly. Investment and its efficiency has been very low. Under these conditions industrial production had continued at snail's pace. Stable agricultural production and reduced imports have contained the damage to growth process.

A Strong Industrial Base

The fundamental characteristic of development strategy of Yugoslav economy has been the reliance on faster industrialization and increased output in this sector. With an average rate of 8.1 per cent Yugoslav industry ranks among the fastest growing in the industrial world. By volume and structure of its production it has placed the country among the newly industrialised nations. A relatively high growth of industrial production has been followed by changes in its structure with production of means of production at first place. The output of steel, copper, mineral fertilizers has increased. Synthetic fibres and products, the chemicals have emerged as new industries. The production of energy resources and consumption goods has a fair record. The failure of the sector has primarily been in the sphere of utilisation of domestic resources and raw materials such that it had to heavily rely on foreign imports. Also, there was an excessive import of foreign technology and uncoordinated know-how leading to the increased deficit in the balance of payments. The production capacity and the fixed assets during the period have increased by 12.5 times. Jobs are supplied with modern technology and equipment. The installed kW capacity per worker has increased by 3.5 times. In 1985 about 75 per cent of all machines were automatic or semi-automatic. The development of industry has created new employment opportunities. It employs now over 2.5 million workers. During this period 6.6 times greater number of industrial workers have ensured 19 times bigger output leading to 2.9 times higher productivity of work. But, even with such results the Yugoslav industry lags behind 2–3 times of productivity that of Western countries.

The rapid industrialization has brought about great structural changes. In the first place is the significance of socialized sector as the foundation of the self-management system. The share of the social sector (although primarily in industry as against agriculture) in social product increased from 62 per cent in 1947 to 87 per cent in 1986. Industry has taken to occupy the dominant place in total production of goods. Meanwhile, in development policy there has been one-sided approach towards industry as the sole factor, thus resulting in neglect towards other activities, particularly agriculture.

The Unstable Agricultural Growth

As against industry, the agricultural output has oscillatingly increased with a modest rate of 2.6 per cent. With relatively slower and up/down

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rate of growth the agricultural sector has undergone some fundamental transformations. Agricultural reforms of early postwar years changed the agricultural holding ownership. The socialised sector has grown steadily. The agro-industrial complexes today produce more than half of the total produce, although they own only 17 per cent of cultivable area. Through cooperation with private producers the production process continues to meet the needs of society and leaves a modest sufficit for exports. Significant progress has been made in the field of technologically equipping the sector. Practically 85 per cent of the driving force is now mechanical. The ratio per tractor is 12 hectares of land. Today 99 kg of chemical fertilizers are being used per hectare of land under cultivation. 161 thousand hectares of land is under irrigation.

The structure of output has also undergone changes. The stock-breeding and crop production have grown at an annual rate of 3.2 and 2.3 per cent respectively. The increase in crop output has been primarily as a result of an increase in per hectare output. A little over 7 million hectare is ploughed. The production of food grains is 17 per cent less today than in 1947. The average yield per hectare is 3.6 tons of wheat and 4.2 tons of corn. Stockbreeding is also on constant rise. The meat production has gone up by 5 times. After 1980 the production of the sector has declined primarily due to the slackening of demand at home and protectionist measures in the West.

The agriculture within the socialised sector employs over 200000 workers. The private sector that owns 83 per cent of the holding produces almost 25–50 per cent lower yields.

In spite of the development of agriculture in general, it certainly lags far behind other sectors and remains highly underutilised (uncultivated land, lower yields in private sector, aging of the active labour etc.). It had long been neglected and least invested. Lately, it suffers from the deficiency of reproductive supplies, and other reproductive materials.

The Problem and Prospects

The crucial problem that confronts the process of development of Yugoslav economic system, which has yet to be solved, is how to secure a proper balance between decentralisation and self-management on one hand, and essential coordinated economic decisions in general and investments in particular, and the macroeconomic management on the other.

The pattern of structural change, however, seems unlikely to be different from the past. The share of industry in output and employment may be expected to increase in coming years but at the expense of agriculture. Industry may be expected to continue to be the leading growth sector given the dynamism of industrial enterprises; increase in economic efficiency partly through technological changes and partly by efficient use of material resources. The rate shall inevitably depend upon increased

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accumulation and investment policy. Another determinant of industrial growth would be the growth of export markets, since domestic market may not grow at a much faster rate.

TABLE 1

YUGOSLAV SOCIAL PRODUCT (SP) AT 1972 PRICES DURING 1947–1985

(in million dinars)

Years	Total SP	Yearly rate of growth	Industry	Yearly rate of growth	Aerkulture	Yearly rate of growth
1947	54245		9899		21515	
1948	65121	20.0	12268	23.9	24962	16.0
1949	70735	8.6	13523	10.2	25657	2.8
1950	63270	−10.6	13612	0.7	18963	−26.0
1951	69514	9.9	13389	−1.6	27560	45.3
1952	59743	−14.1	13233	−1.2	18363	−33.2
1953	69235	15.9	14564	10.7	25208	37.3
1954	71424	3.2	16453	13.0	22360	−11.3
1955	81087	13.5	18837	14.5	27160	21.5
1956	76996	−5.1	20562	9.2	23532	−13.4
1957	92781	20.5	23871	16.1	31567	34.1
1958	94527	1.9	26115	9.4	28450	−9.9
1959	109909	16.3	29624	13.4	35916	26.2
1960	118283	7.6	33853	14.3	33561	−6.6
1961	125086	5.8	35717	5.5	32604	−2.9
1962	129383	3.4	38759	8.5	32330	−0.9
1963	145026	12.1	45052	16.2	34756	7.5
1964	161607	11.4	52445	16.4	35978	3.5
1965	164658	1.9	56362	7.5	33224	−7.7
1966	177511	7.8	58317	3.5	39466	18.8
1967	181520	2.3	58427	0.2	39163	−0.8
1968	188173	3.9	61580	5.4	37633	−3.9
1969	206339	9.7	67701	9.9	41222	9.5
1970	217947	5.6	73242	8.9	38702	−6.1
1971	235540	8.0	80369	9.7	41306	6.7
1972	245547	4.3	86123	7.2	40469	−2.0
1973	257684	4.9	90733	5.4	44184	9.2
1974	279685	8.5	100725	11.0	46627	5.5
1975	289893	3.7	107154	6.4	45288	−2.9
1976	301191	3.9	111042	3.6	48412	6.9
1977	325321	8.0	121595	9.5	51079	5.5
1978	347799	6.9	132101	8.6	48213	−5.6
1979	372317	7.1	142901	8.2	50921	5.6
1980	380864	2.3	148820	4.1	51018	0.2
1981	386851	1.6	154963	4.1	52340	2.6
1982	388174	0.7	155084	0.0	56293	7.6
1983	384265	−1.1	157335	1.5	55816	−0.9
1984	391836	2.0	165365	5.1	57003	2.1
1985	393647	0.6	169830	2.7	52928	7.2
1986	397977	1.1	174755	2.9	54304	2.6

Source: Statistical Year Books of SFRY, 1977 and 1986, p. 81 and 86 respectively.

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TABLE 2

RATES OF GROWTH OF OUTPUT FOR YUGOSLAV ECONOMY

Period	Agriculture	Industry	Social product
1947–85	2.4	7.8	5.4
1947–52	−2.9	5.4	2.0
1953–65	4.7	12.0	8.1
1966–75	3.1	6.6	5.8
1976–80	2.5	6.9	5.6
1984–85	0.6	2.7	0.6

Source: Ibid.

TABLE 3

SOME BASIC INDICATORS 1980–1985

	Rate of Growth
Social product	
Total	1.1
Socialised sector	0.9
Private sector	1.9
Industry	2.9
Agriculture	2.6
Employment	2.4
Labour productivity	−1.5
Real personal incomes per worker	−5.5
Exports	0.6
Imports	−6.2
Personal consumption	−0.7
Gross investment in fixed assets	−6.6

Source: Ibid.

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CENTER-PERIPHERY: SOME ASPECTS OF TRADE AND DEVELOPMENT THEORY

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Introduction

Discussion of Center-Periphery or North-South relations 25 years ago naturally had to concentrate on what seemed then the dominant feature of LDC's trade and development problem. The Prebisch-Singer thesis came as a response to an alleged secular deterioration in the terms of trade of primary products and the complete dependence of LDC's growth on the developed world's demand and raw material substitution policies. The latter was particularly deplorable for the many newly independent states in view of the predominantly 'colonial' feature of this type of production for exports.

Looking back over the last 25 years one can say that constraints imposed by the unequal center-periphery trading relations have remained very much in the focus of development strategy and policy debates but changing circumstances have shifted the emphasis into a number of new and different directions.[1] The attempt to escape from the terms of trade syndrome, based on export pessimism, led to a widespread LDC industrialisation effort in the 1950's, based first and foremost on import substitution. Then came a reaction as a result of accompanying developments observed in the 1960's. Excessive protection, the bias in favour of capital intensive techniques and growing unemployment in the urban sector have characterized the first industrialisation phase of many LDC's. In the well known OECD study by Little, Scitovsky and Scott (1970), for example, all the blame was put on the import substitution strategy. A series of policy proposals was put forward including a complete (or almost complete) removal of tariffs, introduction of a wage subsidy and abolition of capital subsidies. Also incorporated was a presumption in favour of a more pronounced export promotion effort, primarily in industry.

In the meantime there emerged a growing number of success stories in the export field, notably Taiwan, Korea, Mexico, Brazil and others. Some of these, particularly the Asian examples, concentrated primarily on labour-intensive exports which seemed like proving an old trade-

[1]For a good recent survey of the issues see Diaz-Alejandro (1975).

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theory point. Upon closer scrutiny, however, it turns out that a substantial part of this export drive can be identified with the rapid expansion of multinational firm production in LDC's.[1] This in turn has brought back some of the old arguments against what may look like a modern version of 'colonial enclave' style development. This time it is not only the market dependence but the problem of inherent technological dominance of the Center enabling 'exploitation' of the periphery's cheap labour.[2]

The final and most recent development might bring the discussion in some sense right back to where we were 25 years ago. This is the success of some select LDC's in turning the terms of trade in their favour, oil production being the most marked case in point though probably not the only one.

A growing amount of empirical work has in the meantime been done on individual LDC's experience, on cross-section typologies of countries [Kuznets (1966), Chenery and Syrquin (1975)] and on devising planning frameworks for open developing economies. In view of all this it is surprising that relatively little systematic theory exists on the variety of elements that have typically entered the unequal Center-Periphery trade and development relationship. What analytical tools are usually used other than the simple two by two, identical production functions, full employment, static comparative advantage models? Technological gaps and 'learning' have barely touched pure trade theory, nor have the ideas associated with the 'product cycle' [Vernon (1966)] and technological transfer been integrated into the relevant body of economic development theory.[3] When would it pay a country to embark on a costly import substitution strategy even though its technology is completely dominated by the Center? Next, is there an inherent 'stages of development' logic in starting with import substitution and exhausting its potential before an export phase can be reached? When is the periphery 'exploited' and what are the a priori theoretical arguments for and against production of tradables based on direct foreign investment? What are the alternative side effects on the country's own domestic sectors? These are some of the theoretical questions that naturally arise both from the stylized facts and the policy discussions.

We propose to take up some of these questions in this paper with the aid of a relatively simple 2-country 3-good analytical framework which

[1]See Helleiner (1975).

[2]A recent much discussed study by Emmanuel (1972) gives a Marxist analysis of the 'cheap labour exploitation' syndrome. Though it raises some important issues it does not, in my opinion, properly tackle the key role of technological dominance.

[3]An important exception that came to my attention only after the writing stage (thanks to C. Lluch) is Inada (1971). This gives a theoretical formulation of the concept of 'minimum critical industrialization effort' in the context of a monocultural economy.

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departs in a number of ways from the traditional trade and growth model. Sections I and II lay out a stylized pre-industrialisation trade and development scheme in which factor prices (rather than their quantities) are institutionally given. It emphasizes the distinction between non-tradable goods (here a 'traditional sector') and tradable goods (here a resource export and an initially imported 'modern' good) and between the two related external and internal terms of trade. The pre-industrialisation dependency relation is briefly analysed.

The main part of the paper, Sections III to V, takes up the role of the Center's technological dominance in constraining Periphery's factor use in potential import and/or export substitution in the modern sector.[1] A 'two-period', factor price frontier framework, is used to analyse implications of the polar strategies of self-learning ('imitation') as against 'exploitation' through direct foreign investment. Section VI analyzes some of the alternative predictable effects on wages and employment in the Periphery and we end with a few concluding remarks on open policy questions.

Our analysis does not purport to come up with any startling new conclusions. Hopefully there are enough fragments of theory here to clarify major issues and to suggest directions for further pursuit that might be fruitful for both theory and empirical work.

I. The Home Economy—Non-Tradable Goods

We start off with a traditional 'two-country' division of the world. The economically dominant Center, or the relatively developed region (to be termed 'the North') will only be briefly sketched here. Assume it is a relatively high production and consumption per capita region, has a high relative wage, low relative interest rate and grows by accumulation and a constant stream of technical innovations that shift its production frontier over time, while it has relatively low (or zero) population growth. The Center deals and trades with the Periphery, or the less developed region (to be termed 'the South') on which most of our analysis will concentrate. Initially the North needs the South only for the supply of a primary resource (to be denoted by Z). This is required in its production of a tradable good (X) that is consumed by both regions but at first

[1]Amongst other objectives we attempt to give content to a recent reconsideration by one of the pioneers in the field. In a 1971 address on "The Distribution of Gains Revisited" H. Singer suggested a change of position from Singer I (his classic 1950 paper) to a modified approach (Singer II): "analytically, we propose that it would be more realistic to substitute for the chain: factor endowment—product mix—technology—factor use, the following sequence: technology—factor use—unemployment—unequal income distribution. Singer II would suggest that this change in approach is a deeper explanation of the maldistribution of benefits from trade and investment than the previous emphasis by Singer I on deteriorating terms of trade and foreign trade restrictions." [For both references see Singer (1975).]

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produced only by the North. It can be imported by the South in exchange for its export of the primary resource (Z).

We now turn to a more detailed specification of the South's economy. Initially, in the pre-industrialisation phase, the South's rapidly growing population can find employment in only two aggregate sectors. This is the resource production sector (Z), to be further specified below, and the production of a non-tradable ('traditional') good (Y).[1] This can be used for consumption (Y_c) or reinvestment (Y_I) in the form of capital good (K_y) that is employed only in the production of Y together with labour (L_y) and land (H). Assume a constant returns to scale production function $Y(L_y, K_y, H)$ in all three factors. For convenience this will be specified to take the form of a CES (constant elasticity of substitution) production function:

$$Y^{\alpha} = a_l L_y^{\alpha} + a_k K_y^{\alpha} + a_h H^{\alpha} \tag{1}$$

The elasticity of substitution is $\sigma = (1 - \alpha)^{-1}$ and $a_l + a_k + a_h = 1$. Most of what we will have to say remains qualitatively true for more general specifications of production. However, the CES specification which is reasonably general also has one very convenient property—one can express the average product of each factor as a simple exponential function of its own marginal product. For any factor F we have $Y/F = a_f^{\sigma} f^{\sigma}$, where f is the factor's marginal product.[2]

If we denote the nominal wage by w, the product unit price by p_y, the real product wage will be $W = w/p_y$. In the tradition of development economics one can now assume the minimum W to be given (subsistence wage), as long as there are 'unlimited supplies of labour' (Lewis, 1954, 1969). Likewise we assume the real rental rate of capital (r) to be exogenous to the model. This can best be thought of as determined by society's population growth and the rate of substitution of present and future consumption per capita, as measured in non-tradable consumption units (this distinction will be further clarified below). At the very low level of consumption per capita in which the South finds itself this social rate of discount will be considerably higher than the corresponding real rate of interest in the North. It is this difference which provides part of the rationale for capital transfers from North to South. (However, as we shall see such rationale might exist even in the absence of any ex-ante difference in real rates).

[1] To simplify the analysis at no excessive cost we assume each type of good, tradable and non-tradable, to use only its 'own' type of capital good. For a basic two-sector open economy framework see Bruno (1976).

[2] This follows from differentiating an equation like (1) by a factor F. One gets on the left hand side $\alpha Y^{\alpha-1} f$ and on the right hand side $\alpha a_f F^{\alpha-1}$. The rest follows by equating and substituting $\sigma = (1 - \alpha)^{-1}$.

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If one equates marginal products of labour and capital to their given real remunerations W and r, respectively, the average product of labour and the average product of capital (or its inverse—the capital output ratio) will be given by

$$Y/L_y = a_l^{-\sigma} W^{\sigma}, \quad Y/K_y = a_k^{-\sigma} r^{\sigma} \tag{2}$$

With the two average products fixed it is easy to see that the average product of the third factor, land, will be fixed too (and so will be its marginal product).[1] In fact we can write $Y/H = f(W, r)$ where f is a well specified negative function of W and r.

$$Y/H = f(W, r) = [(1 - a_l^{\sigma} W^{1-\sigma} - a_k^{\sigma} r^{1-\sigma})/a_h]^{\sigma/(1-\sigma)} \tag{3}$$

The only way output Y can presently grow in this system is by an increase in the quantity of land available or by increasing land productivity (new seed varieties, new methods of cultivation, etc.). Suppose the effective quantity of land (measured in efficiency units) grows at the rate h; so we can write $H = \bar{H}(1 + h)^t$ where $\bar{H}$ is fixed. In that case the equilibrium growth rate of Y as well as of the capital stock (K_y) and employment (L_y) will be h. Next let us look at output allocation to its two uses, gross investment (Y_i) and the consumable surplus (Y_c). If capital depreciates at the rate μ per unit of time then we have for a growth rate h

$$Y_i = (h + \mu)K_y = (h + \mu)a_k^{\sigma} r^{-\sigma} Y \tag{4}$$

Therefore the consumable surplus, in a steady state, will be

$$Y_c = Y - Y_i = [1 - (h + \mu)a_k^{\sigma} r^{-\sigma}]Y = [1 - (h + \mu)a_k^{\sigma} r^{-\sigma}]\bar{H} f(W, r)(1 + h)^t \tag{5}$$

The long-run consumable surplus of non-tradable goods Y_c is thus determined by W, r and the parameter h. It is a positive function of h[1], a negative function of W (if $\sigma > 0$) and its response to possible changes in r is ambiguous because of two conflicting forces at play. A higher r makes for a lower long run capital output ratio and therefore a lower investment requirement share and higher consumption share in output. On the other hand a higher r, other things being equal, reduces the marginal and average product of land, making for less available output.

A note of warning may be appropriate here. An increase in the real wage W will of necessity decrease the consumable surplus in the long run but need not do so in the short run, while the economy adjusts to a lower permanent production path. An increase in W will, with given quantity of land, reduce output and employment (while increasing the average product of labour). In the short run there will now be excess capital (K_y being temporarily greater than is demanded in the long run). Investment

[1]Strictly speaking this is so only for $t > (1 + H)K_y/K_c$.

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may for a time drop to zero (or even be negative) so that Y_c need not fall for a time.

To complete the consumption side of the model, we postulate the existence of an aggregate demand function for two consumer goods, a non-tradable good (C_y) and an imported good (C_x) as a function of aggregate consumption (C), measured in Y units, and the relative price $q = p_x/p_y$ (q is the 'real exchange rate'):

$$C_y = C_y(C, q), \quad C_x = C_x(C, q) \tag{6}$$

where

$$C = C_y + qC_x$$

Denoting a derivative with respect to j by C_{yj} etc., we assume

$$C_{yc}, C_{xc} > 0 \text{ (normal goods)}^1$$

and likewise assume

$$C_{yq} > 0, \quad C_{xq} < 0$$

Consider now the equilibrium between demand for and supply of the non-tradable consumption good

$$C_y(C, q) = \bar{Y}_c(W; r, h) \tag{7}$$

The bar denotes a 'base year' value which is independent of time shifts, i.e. $Y_c = \bar{Y}_c(1 + h)^t$. For given r and h and given aggregate consumption this leads to an inverse relationship between the relative price q and the real wage W.[2] The higher the real wage the lower will be the supply of consumable surplus and the lower will be the relative price q (or the higher will be $1/q$) that will make demand equal supply at given aggregate consumption levels. In a diagram with $1/q$ measured on the horizontal axis and W/q on the vertical axis (the real wage measured in 'dollar' rather than 'rupees' units), this will be an upward sloping curve with slope greater than W for each aggregate consumption level.[3] Such a curve marked $\bar{C}_0$ is given in the first quadrant of Figure 1. A higher base year aggregate consumption level will correspond to a shift to the right from $\bar{C}_0$ to $\bar{C}_1$.[4] A fixed real wage in domestic units will correspond to a ray

[1]Since these functions may in general depend on distribution and not only on the consumption aggregate, one could envisage a pathological case where aggregate consumption goes up and the aggregate consumption of the traditional good goes down even though it is a normal good for each consumer taken separately. We ignore this possibility here.

[2]In the special fixed proportions case ($\sigma = 0$), $\bar{Y}_c$ will be independent of W and q will be constant for each C. The sytem so far can be closed by fixing q (government exchange rate and tax policy) *or* C. An alternative would be to bring in an explicit savings function.

[3]This slope is given by the expression $(W - q^2C_{yc}/Y_{cw}) \gtrless W$ since $Y_{cw} \lessgtr 0$ and $C_{yc} > 0$. This is where the aggregate normality assumption becomes important.

[4]This follows from the fact that along the equilibrium points of equation (7) for given W, $\left.\frac{dC}{dq}\right|_{\bar{Y}_c} = -C_{yq}/C_{yc} < 0$.

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sloped W_0 from the origin giving equilibrium values $1/q_0$ and $1/q_1$, respectively, for the relative product price, corresponding to the equilibrium points A_0 and A_1, respectively, on the curves $\bar{C}_0$ and $\bar{C}_1$.

If there is growth in the Y sector as a result of increase in effective land use, then an increase at rate h of consumable surplus C_y implies a corresponding increase in aggregate consumption and in the demand for imports C_x (on the assumption of fixed q). These would be mutually consistent only if C can grow at the rate h/ϵ_y and C_x can grow at the rate $h\epsilon_x/\epsilon_y$, where ϵ_y and ϵ_x are the respective aggregate expenditure elasticities. With population growing at the rate n, aggregate consumption per capita will change at the rate $h/\epsilon_y - n$ which may be positive or negative, depending on the parameters in question. For example, with population growing at 3% per annum, and expenditure elasticities $\epsilon_y = 0.5$, $\epsilon_x = 1.5$, effective land supply (or efficiency) will have to grow by 1.5%, at least, and foreign exchange availabilities will have to grow by 4.5%, at least, to keep average aggregate per capita consumption levels barely constant. This is an appropriate point to turn to the export sector.

II. Pre-Industrial Trade

Consider Z to be a primary resource or commercial agricultural activity which initially is of a 'colonial enclave' nature. It uses South's labour (L_z) and North's traded capital good (K_z, depreciation rate μ_x, unit price p_x).[1] If p_z is the gross price of Z and ρ_0 is the North's 'dollar' interest rate then the net potential surplus in Z production will be

$$p_z Z - (\rho_0 + \mu_x)p_x K_z - wL_z = uwL_z$$

where u is the net rate of surplus over subsistence wage payments ($u \geqslant 0$). If we denote by π, the relative international price of the Z good, net of capital services (to be called the 'terms of trade'), we have

$$\pi = \frac{p_z}{p_x} - \frac{(\rho_0 + \mu_x)K_z}{Z} = (1 + u)\frac{w}{p_x}\frac{L_z}{Z}.$$

Writing $l = L_z/Z =$ labour input coefficient[2] and noting that $\frac{w}{p_x} = \frac{W}{q}$ we can finally write

$$\pi = (1 + u)lW/q \qquad (8)$$

Written in this form equation (8) can allow for a number of alternative interpretations. If the Z sector is owned and operated by the North and only earns a rate of profit ρ_0 (which is paid to the North) the net surplus will be zero ($u = 0$) and the South only benefits from the retained

[1] There may be some additional fixed factor (say land) which cannot be used for any other purpose other than Z production, so we ignore it here.

[2] For simplicity it is assumed here that l is independent of w/p_x.

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'dollar value' of wage payments $L_z W/q$. Alternatively it may earn a surplus rate u which would stay in the South in the form of retained profits, higher wage payments to workers or taxes paid to the host government. A fortiori one or a combination of these cases will occur if the operation is taken over by a South public or private firm. Increased monopoly power will show itself in an increase in u and thus in π. An increase in productivity with u constant, for given W/q, will show itself in a reduction in l and thus a fall in π. These various possibilities are shown in the second quadrant of Figure 1 where π is measured along the horizontal axis.

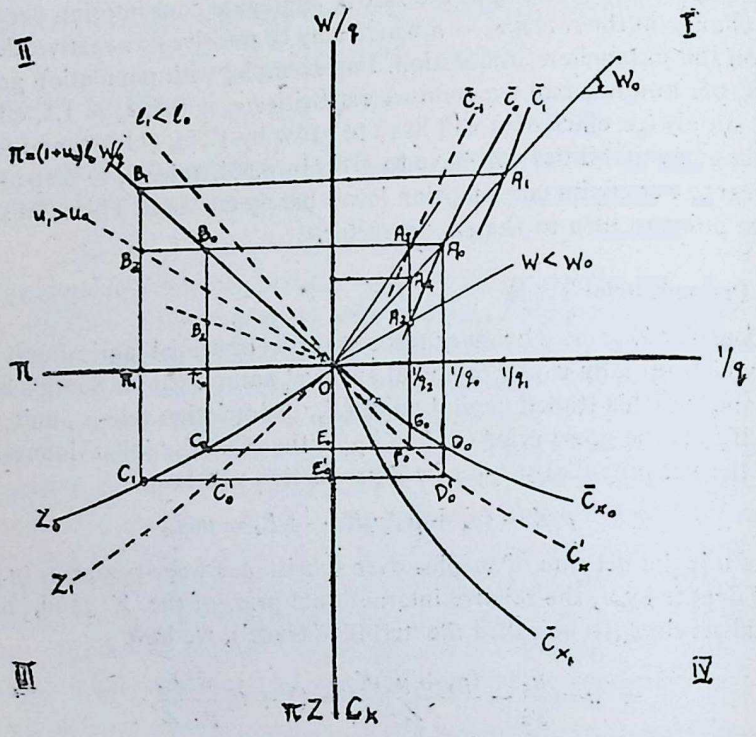

Fig. 1 Preindustrialization production and trade.

For given u_0 and l_0 equation (8) is represented as a ray from the origin, rotating down for $u_1 > u_0$ and rotating up for $l_1 > l_0$. If the terms of trade are given at π_0 (point B_0) with u_0 and l_0 fixed and the real wage is W_0, then q is uniquely determined at $A_0(q_0)$.

To complete the system's initial specification we must consider external trade. Without going into detailed specification of the Center's own stylized two-sector economy (the tradable X sector and an appropriately defined non-tradable Y sector) suffice it to assume here that the North's demand for the South's Z sector's output is an inelastic function of the

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terms of trade π[1] and a positive function of North's output of X which will shift over time. The supply of foreign exchange to the South can be written as $\pi Z(\pi, t)$. This is represented as a positively sloped curve in the quadrant III of Figure 1. With terms of trade π_0, the supply of foreign exchange is given at point C_0 on the curve Z_0 and measured by the length of the segment OE_0 along the bottom vertical axis. A shift in North's demand will move the curve from Z_0 to Z_1. The system will now be closed if we add the demand for the tradable consumption good $C_x(C, 1/q)$ as a function of the real exchange rate of rather a positive function of its reciprocal $1/q$. This is done in the fourth and remaining quadrant where two curves are drawn for the two corresponding aggregate consumption levels $\bar{C}_0$ and $\bar{C}_1$. Balance of trade[2] is imposed by the condition that

$$\pi Z(\pi, t) = C_x(W, q; r_0, h; t) \tag{9}$$

with π, W, q constrained by equation (8).

In terms of the diagram, points at which trade is in balance are given by measuring both C_x and πZ along the lower vertical axis. The point D_0 on curve $\bar{C}_{x_0}$ corresponds to a balance of trade equilibrium at base period levels with W_0, q_0, π_0 clearing the commodity markets, and labour remaining unemployed.

The same equilibrium configuration will remain fixed over time only if the shift in the C_x curve (due to import demand by the South) will be accompanied by corresponding changes in the North's demand for Z. This is shown by the points D_0' and C_0' in the two lower quadrants of Figure 1. Suppose, however, that there is population pressure matched by an increase in land use just enough to keep aggregate consumption per capita constant, and the demand for C_x increases from point D_0 to D_0'. At the same time demand by the North remains static, i.e., the supply of foreign exchange remains fixed at C_0. At the existing relative price a trade deficit emerges by the amount of E_0E_0'. This can be closed, in principle, in a number of ways:

1. A voluntary foreign aid transfer by the North to the South by the amount of E_0E_0' (measured in X units).

2. A real devaluation in the South by the amount A_0A_3 reducing C_x consumption by D_0F_0 and aggregate consumption from $\bar{C}_0$ to $\bar{C}_{-1}$. Paradoxically if π remains constant the real wage in domestic units increases at A_3 (though in aggregate consumption units probably not) but employ-

[1]Life is made easier here if we assume unit interest payments $\rho K_z/Z$ to remain a constant share of the price ratio so that changes in p_z/p_x and π are the same thing. Inelastic demand $\left(\left|\frac{\pi}{Z}\frac{\partial Z}{\partial \pi}\right| < 1\right)$ implies $\frac{\partial(\pi Z)}{\partial \pi} > 0$.

[2]We have excluded from both sides transfers of capital and interest of the Z sector.

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ment in the Y sector will fall. This is a contractionary devaluation.[1]

3. A real devaluation may take place as above, with a reduction in W/q by A_3A_2, W falling below subsistence level, and the rate of retained surplus (u) in the Z sector rising, so that production in the Z sector takes place at B_2. This, of course, is an unlikely occurrence, especially if the North still owns the Z activity. It would much rather reap the benefits to itself in the form of reduced π, making the situation even worse.

4. The South forces a transfer on the North by exerting monopolistic pressure on the price π through imposition of a tax $(u_1 - u_0)$ increasing the cost of North's imports to the point C_1 on curve Z_0 (quadrant III), at higher terms of trade π_1.

The same framework can be used to work out the equilibrium path of π over time, by logarithmic time differentiation of (9) and making use of (8). This would show the exact dependence of the terms of trade on the various expenditure and price elasticities as well as on the productivity parameters, in the manner recently analyzed by Bacha (1977). These may, of course, go up or down depending on circumstances.

Other than in the special monopoly power case South's development is entirely dependent on North's demand for its primary export. One could modify the analysis in various ways, e.g., allowing for greater land productivity by additional inputs (seeds, fertilizers, etc.). These too, however, would imply an increased demand for importables. Whichever way one may turn, it will be 'import constrained' growth imposed by the dependency relationship.[2]

III. Industrialization and the Technological Gap

The next logical step is to ask under what conditions can the South depart from the resource-export dependent state and embark on a different trade and development path. An analysis of the 'import-substitution phase' (let alone subsequent 'export substitution') cannot be undertaken without systematically incorporating the basic role of technology and technological gaps into any Center-Periphery trade and development model. The simplest way in which this can be done in the present context is to consider first the way the tradable good is produced in the North and what are the constraints imposed on the transfer of technology to the South.[3]

Getting around the existence of many heterogenous goods by assuming

[1]Here the contraction comes from the supply side due to the increased wage coming from the Z sector. Cf. Krugman and Taylor (1976) where the contraction comes from the saving function specification.

[2]We obviously ignore a host of other issues here, in particular that of population policies. Reducing South's population growth by birth control (or by migration to the rich North) may be more effective than any other major long run alternative.

[3]For a discussion of some of the problems see P. Streeten (1972).

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their *relative* international prices to be fixed, we can speak of a single composite tradable good which commands a unit price p_x (measured in 'dollars'). Its production (X) may take place with the aid of skilled or semi-skilled labour (L_x) whose product wage we shall denote by W_x, and a tradable capital good (K_x) which is reproducible as part of X ('machines'), commanding a price p_x and a rate of return ρ. In addition such production in the North requires the input of an importable good which for simplicity we can assume to be identical with the resource Z (net unit price P_z). Technological innovations in the North are assumed to have been biased in the direction of economizing on the factor whose price is always expected to increase most rapidly, i.e., labour.[1] It thus makes sense to assume technical progress in the form of a labour-augmenting factor A multiplying the labour input in the production function:

$$X = X[A(t)L_x, K_x, Z_x] \tag{10}$$

In the North this can be assumed to take a simple exponential growth form: $A = A_0(1 + \delta)^t$.

What technological options does the South have at its disposal? At the beginning it may not have the precise labour skills required, but experience has shown that for most relevant industrial activities such labour can be trained on the job. There is a cost of transfer of labour from the country-side or the urban fringe and there may be some real costs of training. As is often done we lump such considerations into the assumption of an institutionally determined and initially constant industrial wage W_{x_0} in the South which is some margin v above the initial 'dollar' subsistence wage W_0/q (we shall subsequently consider changes in v).

$$W_{x_0} = (1 + v)W_0/q \tag{11}$$

The corresponding wage in the North (W'_x) is considerably above W_{x_0}[2] (and growing over time, at the labour augmenting rate of technical progress).

A North firm wanting to operate in the South could in principle use the technology of equation (10), transfer it to the South by bringing in K_x at North's opportunity cost ρ_0, presumably at some initial adjustment cost. Through this new 'colonial enclave' the North firm could cash in on the considerable difference between W'_x and W_{x_0}. We shall subsequently come back to the case of multinational firm investment. For the moment, however, we consider South's own technological options.

In theory, given South's relative low wage and relatively high cost of

[1] See Fellner (1961).

[2] E.g. Average hourly earnings in U.S. manufacturing are between 4 and 18 times those of some relevant 'periphery' countries. [See U.S. Tariff Commission figures, 1970, quoted in Helleiner (1973)].

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capital ($r_0 > \rho_0$), it would have fared best on a hypothetical planet in which technological innovations have traditionally been capital saving and labour using. Life on the planet Earth, however, is much more complicated. Lacking an R & D activity of its own the only option that South has at its disposal at present is North's best practice labour saving technology of T years ago.[1] The potential production function for a South firm is, say, equation (10) with $A_0 = (1 + \delta)^{-T}A(t)$ instead of $A(t)$ multiplying the labour input. If this production function allows for substitution between labour and capital (at least ex-ante), the South may still choose a relatively low capital-intensive activity, on the given frontier. However, this choice must be constrained within the given set of technological options that the North's research and development effort has come up with at some point in the past.

In order to sharpen the discussion and avoid the need to carry the intermediate input Z_x throughout the analysis we shall proceed to analyse the problem in terms of a Value Added Function. Assuming constant returns, defining real Value Added in X as $V = X - \pi Z_x$ and making use of the marginal product condition $\frac{\partial X}{\partial Z} = \pi$ we have

$$V = V(L_x, K_x; \pi) \tag{12}$$

$$\frac{\partial V}{\partial L_x} = \frac{\partial X}{\partial L_x}, \quad \frac{\partial V}{\partial K_x} = \frac{\partial X}{\partial K_x}, \quad \frac{\partial V}{\partial \pi} = -Z_x$$

The value added function retains all the characteristics of the underlying production function with respect to the two remaining factors. We shall therefore stick now to a two-factor representation of production, assuming π to remain fixed for the time being.

Figure 2 represents the technological options in terms of a factor price frontier (FPF) with the marginal product of (skilled) labour (MPL) on the vertical axis and the MPK on the horizontal axis. The lower curve marks the South's effective options. With the real wage W_{x_0} and production at A, it would make losses since it is earning a real rate of return r_1 which is below its opportunity cost of capital r_0. The latter could theoretically be achieved only at the much lower real wage given at $D(W_{x_0} - A_2D_2)$.[2] The North's technological options are given by a FPF that is considerably above the latter curve (see dotted line through the point E) and can be constructed by shifting all points of the lower curve by the same vertical proportional distance.[3] In the North with real wage W'_x capital earns its

[1]Some of North's industries may in fact still be using such 'outdated' technology and have to be subsidized—this may be one possible source of pressure for protection against South's 'cheap' export products.

[2]This is not a real option because at that real wage workers may not be able to subsist or else their real transfer cost is not covered.

[3]In terms of the marginal products of the function (10) one can see that for given K_x or MPK, the MPL in the North is $A/A_0 = (1 + \delta)^T$ times the MPL of the South at all levels.

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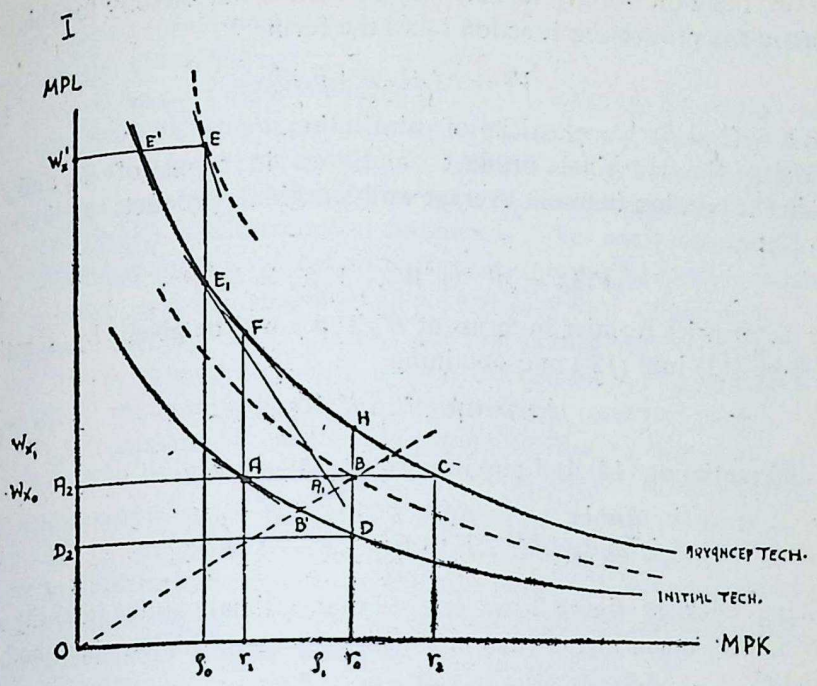

Fig. 2. Factor Price Frontier for 'Modern' Sector.

opportunity cost ρ_0. If a North firm would want to operate in the South it would presumably not be able to be on the North's FPF. Suppose it can operate on a somewhat lower FPF going through the point E'. If it pays the real wage W_{x_0} it would be able to earn r_2 which is considerably above the opportunity cost of capital in the North and is even higher than that of the South ($r_2 > r_0 > \rho_0$).[1]

This is the essence of technological dominance and the ability of the Center as the owner of a superior technology to exploit its strength vis-a-vis the weaker Periphery. The South, however, is not without power. It may not allow the North to come in and it may try to 'learn' by itself. This gives scope for alternative solutions or for bargaining. The question remaining in the latter case is how the benefits are going to be divided between the two regions. But we first consider the factor proportions problem.

One of the very convenient features of a FPF representation to technology is the fact that factor intensities can be read off the slope of the curve (and relative factor shares correspond to the *elasticity* of the curve). Since we shall subsequently make use of a CES specification of the pro-

[1]It is important to stress that the crucial assumption here is the substantial real wage differential, *not* the difference in interest rates. In fact we could have equal interest rates $r_0 = \rho_0$ (somewhere between r_1 and ρ_1, say, in figure 2) and the qualitative argument would still hold.

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duction function for V it may pay to write it out directly for this case. Suppose the production function takes the form

$$V^{\beta} = b_l(AL_x)^{\beta} + b_k K_x^{\beta} \tag{12'}$$

with $\theta = (1 - \beta)^{-1}$ = elasticity of substitution.

Using the marginal product conditions in terms of W_x and ρ we obtain the relation between average and marginal products as in equation (2):

$$V/L_x = A^{1-\theta} b_l^{-\theta} W_x^{\theta}, \quad V/K_x = b_k^{-\theta} \rho^{\theta} \tag{13}$$

The factor price frontier in terms of W_x and ρ will be given by substituting from (13) into (12') and obtaining

$$b_l^{\theta} A^{-(1-\theta)} W_x^{1-\theta} + b_k^{\theta} \rho^{1-\theta} = 1 \tag{14}$$

By differentiating (14) and making use of (13), we get

$$\left.\frac{dW_x}{d\rho}\right|_{\text{FPF}} = -\frac{K_x}{L_x}, \quad \frac{\rho}{W_x}\frac{dW_x}{d\rho} = -\frac{\rho K_x}{W_x L_x} \tag{15}$$

Looking back at figure 2 we can see that optimal capital intensity at E or E' is very much higher than at F which in turn is higher than both at A and C.

If foreign investment is considered socially undesirable or is unprofitable from North's point of view (say there is risk of nationalization, war, etc.) and South's own production of X is unprofitable, there is nothing that would move the system out of its previous low level equilibrium nor would it pay to do so.[1] This, at least, is what the classical Hecksher-Ohlin-Samuelson comparative advantage theory would have told us.

IV. Industrialization Through Learning—A Simple Model

Suppose the South lags behind in the technology it can effectively use (i.e. imitate)[2] now, but it can 'catch up' at a rate that is faster than the North's rate of productivity growth δ, provided it will try hard enough. It can never overtake the North, i.e., it can never hope to get beyond the contemporaneous $E'C$ curve of Figure 2, because the North has a complete monopoly over the innovation process. (By the time the South will be able to do so it will by definition be a member of the North club—vide Japanese economic history.) However, it can potentially, with considerable learning effort, reach that higher FPF and eventually operate at the point C with rate of return $r_2 > r_0$ (by then W_{x_0} may have

[1]The way it might still work, in the special case of figure 2, would be if the South could forever borrow all the capital it needs at a ρ_0 rate of interest. In practice this is unlikely to happen or else $r_1 < \rho_0$.

[2]This distinction between 'innovation' and 'imitation' forms the subject of an interesting ongoing study by H. Wan.

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gone up, but so would technology, or r_0 may go down, but we ignore all this for the moment.)

Ever since Arrow's (1962) seminal paper on 'learning by doing' there have been various attempts to incorporate learning phenomena into growth and trade theory [see Sheshinsky (1967), Clemhout and Wan (1970)]. Usually these are very complex models to handle analytically and the main message gets lost in technical complexity. We shall sacrifice some analytical finesse for the sake of ease of presentation and consider a highly simplified two-period framework and a particular form of learning.

Suppose learning takes place in the first period only (a 'period' may last 5 or 10 years) in which the efficiency coefficient for labour remains constant at A_0. At the end of the period that coefficient increases to $A_1 = A_0 V_0^{\gamma}$ where V_0 is accumulated value added produced during the first period and γ is some non-negative 'elasticity of learning'. From then on the coefficient goes on increasing at the rate of technical progress in the North $A_1(1+\delta)^t$. Also assume these individual 'periods' to be long enough so that the present value of the externality effects produced by this type of learning beyond the end of the second period can be ignored for the first period's allocation decisions.

It requires some stretch of the imagination to think of this form of learning as being an adequate description of the real world but it does provide a reasonable approximation to a phenomenon often observed in the industrialisation process of LDC's. There is a gestation period in which a lot of investment takes place with zero (or even negative) labour productivity growth, then comes a spurt of very high productivity growth rates, much above those observed in the developed world, and a subsequent settling down to a more 'normal' steady growth. At the same time we believe it reasonable to assume learning to be a function of cumulative initial output (or value added) rather than cumulative investment or only time. The formulation given here does, however, limit the time during which learning can take place.[1]

Consider now the following two period maximisation problem. The real dollar wage at the initial stage W_{x_0} and in the 'next' period is expected to be W_{x_1} (which may or may not be higher than W_{x_0}—see below). Suppose capital is required to earn the rate of return r in both periods, depreciates at the rate μ_x between time 0 and 1 and has to be scrapped at the end of period 1. Now suppose society maximizes the net discounted surplus (Ω) with discount factor d[2]; the subscripts 0 and 1 relate to the

[1]Learning as a function of cumulative investment may, if at all, be more relevant to the development process in the innovating Center. In the Periphery some combination of cumulative output and time is probably more relevant, the specific form it takes in practice is, of course, an empirical matter about which we know relatively little. In this context see David (1975) and Cohen (1973).

[2]This may or may not be identical with the rate of discount implied in r—see below.

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two periods respectively

$$\Omega = V_0(A_0L_{x_0}, K_x) + dV_1[A_0V_0^{\gamma}L_{x_1}, K_x(1-\mu_x)] - (W_{x_0}L_{x_0} + dW_{x_1}L_{x_1}) - rK_x(1+d)$$

As long as $A_1 = A_0V_0^{\gamma} < A$ (North productivity level) the necessary first order (marginal productivity) conditions for a maximum are given by the following system:

$$\frac{\partial V_{x_0}}{\partial L_{x_0}}(1+s) = W_{x_0}, \quad \frac{\partial V_1}{\partial L_{x_1}} = W_{x_1} \tag{17}$$

$$\left[r - \frac{\partial V_0}{\partial K_x}(1+s)\right] = d\left[\frac{\partial V_1}{\partial K_x}(1-\mu_x) - r\right] \tag{18}$$

where

$$s = \gamma dW_{x_1}L_{x_1}/V_0$$

Note that all of the above is independent of the particular form of the production function for V.

The following conclusions emerge from this simplified exercise:

1. While in period 1, by the end of the earning period, the marginal productivity of labour must be equated to the wage rate, this is not the case during period 0, the 'learning phase' in which labour should optimally be employed beyond the level dictated by the then reigning real wage. The reason is the externality imposed by the fact that production in period 0 feeds into improved productivity in period 1.

2. Equation (18) gives an analogous result for the rate of return on capital, except in that case the two period discounted profits are combined into one condition. If we also assume that capital is employed to the point in which the post-learning net rate of return by itself must be r, then (18) will read $(\partial V_0/\partial K_x)(1+s) = r = (\partial V_1/\partial K_x)(1-\mu_x)$ in full analogy with (17).

3. A decentralized procedure by which private sector behaviour would be induced to behave according to the social optimum is either to subsidize both labour and capital by the same rate s or else tax the consumption price of the product at the optimal tariff (subsidy)[1] rate of $s = \gamma dW_{x_1}L_{x_1}/V_0$. The implied effect on the Y-sector will be analyzed in Section VI.

The tariff (or subsidy) rate here has a simple specification—it is the product of the learning elasticity with the (discounted) ratio of the period 1's wage bill to period 0's value added.[2] The effect of such tax-subsidy scheme can be seen by looking at Figure 2. The line of 'effective' rates of

[1]Tariff on value added in case of an import substitute or a subsidy on value added in case of an export.

[2]Total tariffy (subsidy) payments will be the product of γ and the wage bill $dW_{x_1}L_{x_1}$. Also note that if the subsidy is financed by taxing period 1's income, that tax rate should be the product of γ and the wage share $(W_{x_1}L_{x_1}/V_1)$. E.g., if $\gamma = 0.4 dW_xL_x/V_0 = .5$, we get $s = 0.2$

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return after s is imposed is given by a shift in the original FPF outwards in a manner that preserves the slope of the curve along any ray from the origin. This is given by the broken curve in Figure 2. At the real wage W_{x_0}, the subsidy is just enough to make the rate of return equal to r_0 (at the point B). At the end of the learning phase (period 1), production can take place along the advanced technology curve. At the real wage level W_{x_0} the rate of return now becomes $r_2 > r_0$ (at C) or else at the opportunity cost level r_0 the higher real wage W_{x_1} can be sustained (at H).

The same figure can also be used to show alternative 'inefficient' ways of inducing production at period 0. The industry may be induced to produce at A by giving a full subsidy only to capital to the tune of $(r_0 - r_1)$. This is very often the way economies in fact operates in practice. Producing at A would obviously imply excessive capital intensity—the slope at A is higher than at B (which in turn is the same as the slope at B' on the original curve). Alternatively, the industry may be induced to operate at D, by paying a wage subsidy of the amount of $BD - A_2D_2$.[1]

So far we have said nothing about the possible limitations on the demand side. It is here that a major distinction has to be drawn between import substitution and potential exporting. South's choice of tradable good as candidate for production is most likely to come from the range of goods presently included under C_x. A priori their price and quality are better known, a domestic market once protected is a captive market, and there is less technological and market uncertainty involved. Imagine C_x to consist of a vector of heterogeneous goods but of constant relative international prices. Any one product X_i that can be a candidate for domestic production is limited to a fractional share g_i, say, of the total C_x.

In analysing the allocation decision that the South has to make we have so far taken it for granted that it can in fact achieve the maximum learning that would bring it to the level $A_1 = A_0V_0^{\gamma}$ by the end of the learning phase. What happens if the size of the economy and/or its market cannot sustain the domestic demand that is implied, i.e., what if $g_iC_x < X_i(V_0)$? In that case either the desired technology level A_1 that is implied by $A_0V_0^{\gamma}$ will not be achieved, or else, if the full amount $K_x(V_0)$ is invested it cannot be fully utilized in period 1. In either one of the cases profits will not reach the levels that have been computed above. Low productivity levels, under-utilisation of capacity and capital losses may occur. Governments will be induced to subsidize such activities excessively. The smaller the size of the economy, at given per capita income

[1]The latter is the policy prescription given by Little, Scitovsky and Scott (1970). Note, however, that this would not be appropriate if the true shadow price of labour is W_{x_0} and if learning as above is a function of accumulated output rather than accumulated labour input. Obviously the specific form that learning takes will affect the 'right' form of subsidy (a point overlooked by LSS). Thus, differential subsidy to capital could be justified in the case in which learning is a function of cumulative physical *investment*.

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levels, the more binding such limitations on feasible A_1's will be and the more quickly import substitution possibilities may be exhausted and the industrialisation process may stagnate.

In theory, at least, this is where production for exports comes in. Realistically, however, we would have to introduce the additional constraints that are imposed once the effective market becomes the external market, usually that of the North. Formally we could take this into account by assuming the effective price for an export good to be $P_x(1-\zeta)$ where ζ is some measure of cost of transportation and penetration of markets, tariffs imposed by the North etc.[1] In working out the dynamic comparative advantage that different tradables may have for the South on the basis of our model one would thus have to take into account not only the learning elasticities γ_i but also the import substitution ceilings (g_i) and the incremental ζ costs that come in once the import substitution limit or export threshold level is reached. These considerations go some of the way in explaining why LDC's start by an import substitution phase and after a time exhaust its potential, why large economies may achieve smaller import/GNP ratios and have less need for 'export substitution'.

Finally, suppose a loan is obtained from the North to finance the import of the capital goods required in $X(K_x)$. How does the rate of interest on the loan affect the previous calculation? If K_x can be used elsewhere in the economy at the rate r_0 (suppose it can be transformed into K_y, or supplement K_y in the improvement of Y sector performance), then this is the relevant rate to include under r in the above model. However, the borrowing rate may affect the discount factor d. In the extreme case in which the marginal cost of foreign borrowing is fixed at ρ_0 (North's opportunity cost of capital), at no concession and no risk factor, d will be $(1+\rho_0)^{-1}$, since this will be the rate of substitution of present and future foreign exchange.[2]

The latter is, of course, the case in which the South potentially reaps the full benefit of the difference between the prices of factors of production in the two regions. Let us now turn to the other polar extreme.

V. Transfer of Technology Through MNF's—A Comparison

Consider now the case in which a North (multi-national) firm goes into the South with capital costing ρ_0, having at its disposal right away

[1] A reduced price p_x has the effect of shifting the FPF inwards, parallel to itself, thus appearing qualitatively like the technological gap phenomenon analysed previously. Note that the market learning argument provides a rationale for export subsidies over and above the tariff for import substitution of the same good.

[2] If overall production is to be intertemporally efficient the real rate of exchange must, ceteris paribus, change between 0 and 1 at a rate that reflects the difference between r_0 and ρ_0. [See Bruno (1976)]. There will be a corresponding effect on $W_x = (W/q)(1+v)$, keeping $W_x \cdot d$ unchanged, unless $W(1+v)$ changes.

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the technology represented by the curve E_1FHC in Figure 2.[1]

With the real wage given at W_{x_0}, the North firm in principle has at its disposal all the options appearing in the range E_1C of the curve. The 'maximum exploitation' surplus rate will be $r_2 - \rho_0$, if the wage W_{x_0} is adhered to and the firm employs the most labor intensive technology represented by point C. A more reasonable choice in practice might be to import a much more capital intensive technology from the North, not as capital intensive as at E' or E, but somewhere intermediate.[2] Suppose it takes the technique represented by the slope at E_1, and pays the wage W_{x_0}. It will actually find itself on an 'inefficient' point A_1, but still earning the rate of return $\rho_1 > \rho_0$. [3] Another possibility, consistent with empirical observation, is to pay a real wage that is higher than implied by South's considerations, say produce at the point F. [4]

Let us now compare the two extreme strategies in terms of employment creation for a given quantity of capital. Our initial assumption is that the North firm operates optimally at C (in both periods) and the South firm starts at B in period 0 and ends up at C in period 1. Using the CES model (12')(13), with given K_x, W_x and A, we get, after suitable substitution, the supply function for V and the demand function for L in period 1 as follows:

$$V = K_x[1 - W_{x_0}^{1-\theta} a_l^{-(1-\theta)} A^{(1-\theta)^2/\theta}]^{\theta/(1-\theta)} \tag{19}$$

$$L_{x_1} = K_x[W_{x_0}^{-(1-\theta)} a_l^{1-\theta} A^{-(1-\theta)^2/\theta} - 1]^{\theta/(1-\theta)} \tag{20}$$

In period zero L_x for the MNF is the same as in (20) while for the South firm it is

$$L_{x_0} = K_x\left[\frac{(A/A_0)^{-(1-\theta)/\theta} K_x^{(1-\theta)/\theta} - a_k}{a_l}\right]^{-\theta/(1-\theta)} \Big/ A_0 \tag{21}$$

For a given A, W_{x_0} and K_x, L_{x_1} is fixed by (20). Note that it will be higher the higher is K_x, the lower is W_{x_0} and the lower is A. With the

[1] One could, of course, argue on practical grounds that the North too can improve its adaptation to the new conditions at a rate higher than the exogenous rate δ, but for simplicity we ignore this possibility here, nor do we take into account the shift at the rate δ that would take place exogenously between period 0 and 1. The results can easily be adapted to take that into account.

[2] This seems to be consistent with the empirical evidence [see Mason (1973), Cohen (1973)].

[3] Empirical studies usually show that $\rho_1 > r_1$ and $\rho_1 > \rho_0$ [see Hufbauer (1975)]. There are difficult problems of measurement here because a typical MNF has political and economic incentives to hide high rates of return in the form of transfer prices, etc. This may explain why the observed differences in rates of return seem relatively small.

[4] The argument is sometimes made that an MNF bringing in a modern technology has some incentive to economize on the quantity of labour at the price of being more selective and paying a higher wage since it would otherwise have more difficult management problems. For a good survey of the literature on MNF investment see Hufbauer (1975).

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same real wage and given capital stock, greater technological advance means a reduction in employment, as does an increase in real wage. The total demand elasticity for labour with respect to the real wage can be shown from (20) to be $-\theta/\phi$ where ϕ is the capital share in value added.[1]

From equation (21) we see that for given A the lower is A_0, i.e., the higher the initial technological gap to be bridged, the more employment will the South firm provide in period 0. For a sufficiently high gap it will provide more employment (at lower efficiency level) than the more efficient North firm. Since at point C the two firms would become equal, this would imply that there is a reduction in employment in the South firm as productivity picks up unless the capital stock increases. Again this is consistent with empirical observations—it takes continued very rapid industrial growth to absorb increasing numbers of workers in LDC's manufacturing industries.

In practice, of course, things are not quite the way they were described here. The MNF would normally offer a higher than equilibrium wage thus providing less employment per unit of capital even in period 1.[2] On the other hand, South's price-distorted choice of techniques (due to excess subsidisation of capital, etc.) might in practice provide less additional employment than is theoretically optimal at period 0 stage, even under existing technological options.

Next let us return to the question of production for export. It is here that a multinational firm may have an additional natural advantage vis-a-vis a South firm over and above its initial technological edge, making for even less equal opportunity. Having easy access to marketing facilities saves the MNF from the export 'learning' stage (it is reasonable to assume that part of the ζ cost factor mentioned above may be reduced through learning the skills of international marketing). Also, if the commodity is itself an intermediate product for which the South only adds some processing, existing tariff arrangements would facilitate re-importation to the North in a way that may be less costly than for a South firm by itself. This may go part of the way in explaining why MNF's tend to concentrate in potential export industries and why the enormous recent increase in labour-intensive exports of some LDC's was in considerable part done by MNF's.

As against the marketing and technological advantages of MNF production there are some major objections that can be reinforced on the basis of this analysis. One is the point about profit rate exploitation. The

[1]Cline (1975) who mentions this formula makes the point that labour intensity may be quite sensitive to the real wage, if one takes the total effect (including output adjustment) into account. If, say, $\theta = 1$ (Cobb-Douglass function) and $\phi = 1/2$ we get an elasticity of 2.

[2]Also the MNF may often unjustifiably benefit from both worlds—high technology as well as a high level of effective protection [see Hufbauer (1975)].

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monopoly on information allows the MNF to reap a rent that could be shared by the South only if it undergoes a learning process or imposes a tax on MNF profits. Secondly, we note that MNF production of the modern good at least formally may not be different from the exploitation of the Z good analyzed in Section II. In the extreme case it is as if a net wage paid to South labour is retained in the South and no more[1]. It leaves the economy to the vagaries of firms that might shift any time to another 'reserve army' of cheap labour.[2] The closer the South gets to the full employment stage the more imminent this danger becomes.

It has been argued by a number of authors, particularly in Latin American context, that the real wage paid in the modern version of the 'colonial enclave' tends to be spent mainly on imported luxuries (or on the goods subsequently to be substituted by the very industries in question) thus compounding the dependency and balance of payments problems as well as the South's internal distributional inequities (the so-called "Belindia" syndrome).[3] Finally, as we have seen, there may be a tendency for MNF's to push wages above what they would otherwise be, pre-empting would-be South entrepreneurs from undertaking South's own investment. This also has important repercussions on the Y-sector to which we now turn back.

VI. Effect on the Home Economy and Concluding Remarks

To complete the analysis we now look at the accompanying repercussions of X-sector developments on the rest of the economy.

For this purpose we assume prices and wages in the Z-sector to remain unchanged (in terms of Figure 1 we keep the terms of trade at π_0 and the real product wage unchanged at B_0). For simplicity we also ignore time shift elements coming from the movements of land productivity and shifts in North's demand for Z. Thus the two relevant foreign exchange supply and demand curves at the initial stage are Z_0 (in quadrant III) and $\bar{C}_{x_0}$ (in quadrant IV).

Suppose now that in order to enable the import of the capital goods K_x, the South cuts its demand for other imports by the amount ΔC_{x_0} which is just equal to $K_x - V_0$, where V_0 is the value added saved in imports (or earned in exports).[4] This is shown in figure 2 by a movement from the point D_0 to G_0 on the curve τ_{x_0}, with $\Delta C_{x_0} = \overline{F_0 G_0}$. In

[1]This assumes no spill-over of know-how effects and no training of potential leaders of South industry—both of these may in theory of course be important ingredients of a deal between an MNF and the host country.

[2]In the extreme form the pattern would be almost the same as the uncertain employment of migrant South labour in a North economy.

[3]See Taylor and Bacha (1975).

[4]We can ignore the indirect effect on the input of Z_x into the X-sector on the assumption that this replaces what would otherwise be an import of the corresponding North industry from the South's Z-sector.

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order to effect this change the South has a number of alternative policies at its disposal, all of which must at the same time be consistent with the proper subsidisation of X-sector production in period 0. However, we ignore the fine tuning of individual sector tariff and demand adjustment to the aggregated multisectoral effects. Let us simply consider the adjustment in terms of the aggregate relative consumption price of tradables in terms of nontradables (q).

In terms of Figure 2 this would imply an initial increase in q from q_0 to q_2 and thus a movement of the Y-sector equilibrium to one of the points lying to the left of A_0.[1]

1. A tariff on C_x keeping W constant

This corresponds to a movement from A_0 to A_4 along the ray of constant W_0. This is done by imposing a tax τ so that $q_2 = q_0(1 + \tau)$, while W/q_0 remains the constant dollar wage in the Z sector. The vertical distance A_3A_4 now measures the discrepancy between the product wage W/q_0 and the wage in terms of purchasing power of tradables W/q_2. The fact that the latter goes down means that the real wage of workers in the traditional sector must have gone down in terms of consumption units.[2] Since there are now L_x workers in the modern sector earning a higher real wage W_{x_0} than they have earned earlier either in the traditional sector or being unemployed, there is a worsening in the distribution of wages in the economy[3] along with reduction in aggregate consumption per capita. The latter follows from the fact that while the consumable surplus of nontradables has remained unchanged, the consumption of tradables has been reduced by ΔC_{x_0}. Aggregate consumption $\bar{C}$ at A_4 is obviously lower than at A_0. We note the remark made earlier that this is a reduction in steady state consumption which need not take place instantaneously (because of the gradual adjustment in investment requirements). We also note that total employment in the economy will in this case increase by L_x.

2. A tariff on C_x keeping $\bar{C}$ constant

This corresponds to a movement from A_0 to A_2 along a constant $\bar{C}_0$ curve. Here *average* per capita consumption stays constant but the distribution worsens even more, since a reduction in W (and not only in

[1]The only case in which this would not be required is the unlikely event in which $V_0 > K_x$ right away. Since the import of K_x must always precede at least some of V_0 output, this will happen only if the South can borrow from the North. To effect such a net transfer, ceteris paribus, there must be a movement of $1/q$ to the *right* (with a possible rise in aggregate consumption).

[2]The true consumption wage will be some average of W and W/q_2.

[3]Here is a case in which industrialisation for a time might cause *absolute* as well as *relative* impoverishment. We do, of course, abstract from other factors, e.g., land improvements, that might simultaneously work in the opposite direction.

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W/q) is implied. Employment, however, rises by more than in the previous case.

3. Real devaluation keeping W/q constant

This corresponds to a movement from A_0 to A_3. There is an increase in W (and therefore also in the average consumption wage), but a reduction in Y and in employment making for a reduction in steady state aggregate consumption to $\bar{C}_{-1}$.

How can real wages of the employed rise (this is a fortiori true for L_x employees) and aggregate per capita consumption go down? Either the income of newly unemployed is much lower than those of the employed or else consumption of rentiers and capitalists drops sharply. Note that in this case although there may be an apparent improvement in the distribution, overall employment in the economy may fall. This happens if $\Delta L_y > L_x$.

A rise in real wages is more likely to take place if there is a push for an increase in wages coming either from an approach to the full employment stage or from organized labour or if the competition between MNF's and South firms in the modern sector makes for a rise in W_x (see previous discussion) that draws workers away from the traditional sector and drives up the wage there. Paradoxically a lower degree of MNF exploitation, measured in excess profits ($r_2 - \rho_0$) may go together with a greater premature push to real wages, thus harming potential domestic production in the X-sector as well as imposing difficulties on employment in the traditional sector if complementary factors of production are not made available there. This puts the emphasis on the need for a 'balanced' development effort as between the tradable and nontradable goods sector.

We must now note that the above analysis only applies to the adjustment required in period 0 of our stylized model. For each individual industry taken by itself, there should come an end to the learning phase at which V increases from V_0 to V_1, a tariff is in principle no longer required and net foreign exchange surplus may now be generated, equal to or greater than the reduction in demand for C_x that was previously imposed. If this takes place, then in terms of Figure 1 one may afford to switch back beyond point A_0 so as to enable a consumption level (say $\bar{C}_1$) over and above the initial level ($\bar{C}_0$). It is in this way that import substitution and/or export promotion should help to push up the rate of growth of the South over and above its pre-industrialisation phase.[1]

[1]However, a number of pathological phenomena might be envisaged—e.g., a demonstration effect increasing luxury imports among X sector employees or MNF dominance causing losses in traditional South exports, making for a net increase in foreign dependence rather than an alleviation thereof, or a failure of the import substitution effort, as previously mentioned.

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Next one should consider the effect of relaxing the assumption of a constant π_0. If we move from partial equilibrium for one industry or one economy to a general world equilibrium, it is clear that eventually there will be a tendency for π to rise as a result of an increase in W or a fall in p_x (or both) unless the labour input ratio (l) in Z is made to fall pari passu.[1] From the North's point of view there will be a conflict of interest here between MNF investment in South's X-sector and the implied effects on the cost of its own inputs.

These considerations would in turn lead us to a host of policy issues connected with the effects of alternative types of North-South exchange on North's economy, which lie outside the scope of the present paper, having confined ourselves mainly to the South economy.[2] North's policies with respect to tariffs on industrial imports, terms and size of foreign aid and tax legislation on MNF's are of crucial importance for the present analysis, but are not independent of South's possible repercussions on various sectors of North's economy. Obviously, it is a complex bargaining situation in which one side starts off from a highly advantageous position but the other side is not without power to affect its partner's behaviour.

Most of our analysis for the South was conducted in terms of the contrast between two polar strategies. Practical policy solutions usually involve mixed strategies. There will always be some combination of tax, tariff, interest rates and proper legislation at which one or the other trade and development pattern would be considered socially preferable. A theoretical discussion such as this can only hope to clarify some of the elements that would have to play a role in any practical welfare calculus. The latter in turn may vary under different circumstances.

Finally it is important to stress the need to extend the analysis, even on a theoretical level, into a world in which there is more than one player on each side of the Center-Periphery game. It has long been stressed that import substitution within the broad group of Periphery countries may take the form of individual members actually exporting to each other. Next, in the real world very few countries of the Periphery can hope to turn the terms of trade in their favour while others must suffer from the same. Such differential patterns may also divide the Center camp as may be aid-giving or MNF legislation requirements. If it

[1]Johnson's (1955) classic analysis has already dealt with some of these general equilibrium patterns.

[2]The underlying two country model was initially spelled out in fuller detail for *both* trading partners, but we have found it preferable, for reasons of interest, exposition and space to confine ourselves to one side here.

There is by now a growing literature on the effects of technology transfer and foreign investment from the point of view of the Center [see, for example, Caves (1971), McCulloch and Yellen (1976) and the general survey by Hufbauer (1975).]

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were not for these complexities of the real world, international agreements would, of course, be more easily obtainable and pure economic theory might probably have more to offer at its present stage.

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BEYOND THE MARXISM

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Looking at the current world situation, we notice that there still are confrontation between classes, poverty and alienation of human beings. More important, however, are such issues of burning concern as stagnant economies of advanced nations, economic deadlock in developing nations and starvations in underdeveloped countries. Also it seems we are in danger of annihilation as a result of atomic bomb radiation, nuclear warfare and global environmental disruption. So it is imperative to put the brakes on hatred and distrust-driven confrontation between the super powers, their rivalry for supremacy, ubiquitous infringements on human rights as well as unbridled industrialism and commercialism. I think the terminal symptoms of these modern nations should be overcome by supranational communities or those comprising mutual aid-oriented communities and workplaces.

Contrary to Marx's monistic and optimistic perspective, the fact is that the problems are expanding, deepening and diversifying on a global scale. These problems can never be overcome by merely solving capitalistic class confrontation.

It is true that Marxism which builds on materialism and dialectic is so simple and clear, and therefore very easy to understand. As G. Adler put it, "man's actions are all aimed at gaining supremacy (rule)". Rivalry for supremacy is perhaps one of the most important characteristics of human nature. But the methods and techniques of ruling or controlling have become so diversified and ingenious. F. Herzberg wrote, "Material incentives such as wage may serve to remove people's dissatisfactions. But it is to be recognized for what they like to do or satisfy with their own self-actualization that really plucks up their courage."

A handful of power elite may certainly be engaged in a fierce competition for power and supremacy. But many other Japanese people who are submissive to authority are more oriented toward self-defense against *economic burdens* or improvements in their quality of life than toward gaining power and supremacy at a time when they find it increasingly difficult to make both ends meet. It is indeed only a handful of very privileged power elite groups that are class struggle-oriented.

Many Japanese people are simply living frugally and at the same time are yearning for the symbols of the result of their self-help efforts or their

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upward mobility. As A. H. Maslow's theory of 5 levels of man's self-advancement shows, when one's physical and security needs and wants are satisfied, one's material love needs and wants—needs and wants to possess things—become intense, and when these material love needs and wants are met, then one comes to have mental needs and wants—to be respected by others. And eventually one will become oriented toward self-fulfilment which transcends others' praise and blame.

This school of materialism is apt to make light of the above mentioned man's mentality—orientation toward self-realization—emphasizing too much man's material orientation. This school of Marxism never goes beyond that.

Also this school of thought which places the greatest emphasis on "class struggle" is very unlikely to recognise the merit of Japanese-style business management. Man is essentially a social animal. So it is only natural that people collude with one another or make friends with one another. It is said that the three fundamental activities of primitive men were to walk on their feet, use stone tools and form a group of about 30 (and division of bag).

Dr. Kinji Imanishi who aspired to go "beyond Darwin" made public his theory of Species's habitat preference ("Theory of Evolution of Species's Identity"). He wrote that "species's identity is destined to change" but that "a sort of social identity should be recognized".

This way of thinking, in the case of Japanese, may have led to excessive emphasis on interdependence and the "amae" mentality-based collusion, which is internationally known as "Japan Inc". It may also lead to "recurrence of a national prosperity and strength policy". But it may be helpful in discussing the future of the Japanese nation to come to grips with the characteristics of such a social group and build on the understanding of them. I would like to add the element of "social system" and "intelligence" (to be explained later) to the conventional three basic elements of nature, labor and capital. I think the concept of human capita is as important as labor and capital and is unique in that it is led byl intelligence and forms the basis of man's identity.

"Wage-labor is one of the most important Marxian concepts. But in recent years the time and energy consumed for earning wage have been on the decrease. During the 100-year period from 1880 to 1980 in Japan, for example, workers' average annual working hours decreased from 3,000 to 2,000 hours. During the same period, their wages increased thirteen-fold in real terms and their workweek also decreased considerably. Furthermore, the quality of their work has been improved remarkably. It appears that many of them are now devoting much of their free time to services to their families, their hobby and development of their own multi-faceted personal capability. It is quite natural that as their free time,

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particularly that for their creative volunteerism, increases, younger workers will become less sympathetic with traditional labor unions.

Some survey results indicate that if high technologies are utilized efficiently, most workers will be able to earn enough to support their family by working two days or so a week. Such a mechanical optimism may not hold true at least during the rest of this century, but the quality of man's work will certainly change dramatically by the end of this century. It is a fact that workers' free time is now longer than their wagelaboring hours. If they place more emphasis on mental self-discipline than on material pleasures in spending their free time, it will, coupled with increasing emphasis on soft industries and high technologies in the economic world, enhance human values per se. As a result, they will come to have *more surplus* value *than ever*. Thus free time will become one which is not to be merely consumed but to be invested or used to raise investment efficiency.

In other words, technological innovations have thus far played the role of replacing man's physical functions as artificial skills. From now on, however, human capital which is possessed of the intelligence and wisdom for harnessing these technological innovations will become more and more important. Also greater importance will be attached to human capital which creates values for such intangible things as technological know-how and software, and examines and screens such values.

All in all, in an era of soft industries which is the first step toward a real post-industrial age, we cannot but place more emphasis on development of human capital or human resources than on accumulation of material, monetary capital, from a standpoint of not only fairness but also efficiency.

Particularly Japan is blessed with excellent human skills and a human resources development system that support them. Furthermore, there are very innovative business leaders who are actively tackling the problem of creating new compound production systems by developing new investment opportunities and mobilizing various elements involved in production.

T. W. Schultz calls these human resources "human capital" and places it in the nucleus of his theory of agricultural economics. I think his definition of "human capital" can also be applied to economy at large. This "human capital" is promoted by educational services, in its broad sense, encompassing school education, academic research and so on. In terms of stock, it is dependent on the level of intelligence that leads the level of knowledge. The level of intelligence has a close correlation with the above-mentioned social organizations and systems including business corporations and workers' workplaces.

More specifically, human capital possessed of such intelligence has promoted the Japanese economic development by skillfully combining

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various production elements. The past high return on investment of Japanese business and industry was attributable not only to material capital but also to this "human capital". But the gradual decline in gross return on investment which topped off around 1968 is not yet fundamentally recovered despite huge investment in public works after the oil crises. This is due to the long-standing global stagflation and decline in both quantity and quality of human capital. And the major reasons for the worsening of human capital are restraints and loosening of mind that have resulted from the collusion among government, business and industry and administration organs,—in other words, general waste of time and energy, and inefficiency in Japan. Given the above-mentioned collusion and decline in vigor of the private sector, the government will never fail to support the private sector as much as possible, as has always been the case with them. On the other hand, however, demand for utilization of human capital with its infinite possibilities will be voiced ever more loudly. In fact, in both the United States and Japan there is a cry for "human resources education" and "respect of humanity".

But now the collusion is in the state of trade-off with "respect of humanity". As the socio-psychological structure of "amae" erodes the basis of human resources and heavy taxes, inflation and depression which capitalize on such a social system prevail, human capital will suffer more and more on one hand, and underground economy will prosper on the other.

And what is worse, it is feared that the world economy which is now in a lull may reenter into a secular stagnation, causing a global financial panic and hyper inflation. This sympton of the world economy is as suggested by Kondratieff-cycle and the succeeding wave and its terminal symptom may be just the same as predicted by Marxian theorists. It may be the exact result of conflicts between state capitalisms. But it will undoubtedly be the broader-based life-innovators rather than workers at large that will take the lead in innovating movements to combat with this trend.

In that case, the two big forces which are even today in rivalry with each other will escalate their antagonism and even burst into an outright confrontation. This is a battle in the midst of a state of saturation caused by unbalance of over investment and underinvestment, money game and overconsumption and underconsumption. In other words, logic of power plagued by excessive expansionism versus logic for survival of the life-innovators, popular movements for bottom-up democracy and solidarity. This battle will be fought both at home and abroad, on a global scale. This battle will be fought wide and deep for survival beyond political and economic struggle for power and supremacy.

In any event, Marxism is a good example of the 19th century monism.

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It emphasizes specifically social malady and at the same time capitalizes on it. Marxism rightly pointed out such social malady, and such social malady is universal and therefore very easy to understand. The harmful effects of its exaggeration of social contradiction are too obvious. But modern economists and Keynesian economists are equally to blame in this respect. They also show their own terminal symptons by overly depending on numerical formulas, thereby entering a labyrinth and by approving of big governments that continue to swell. Or it may be that Cartesian dichotomy made some serious mistake "in the name of science". It is quite natural, therefore, that there is a growing tendency toward unification of totality, historicity and preoccupation with policy.

It is still a common weakness of economists to identify social sciences with natural sciences, model economics after physics and regard value-lessness as objectivity. Although subjective values were ruled out through the famous dispute over value judgment, rich, balanced humanity was forced out on the basis of the monistic value judgment. As a result, this world was polluted and disformed both physically and spiritually and the above-mentioned secular stagflation was caused. Social sciences which build on man's identity can never be free from ultimate value judgment.

For example, Adam Smith's logic of productivity on the eve of the Industrial Revolution, Ricardo's principles which overlooked the relatively modest gold standard in the 19th century, Marx's theory of struggle which is based on his insight into the class confrontation preserved in the course of progress of capitalism and Keynes' theory of effective demand which proposed to resolve impasse of capitalism by means of full empolyment policy stressing public spending are thoroughly value-creation theories based on sharp insight into the current of the times. Already fifty years have passed since Keynes made public "The General Theory of Employment, Interest and Money". I am now wondering when, where and in what form a new revolutionary theory to propose a way to overcome the current global secular stagflation will appear. I think there already are signs that such an economic theory is in the making. But such a theory may not be officially recognized unless a serious catastrophe such as a large-scale financial panic or a hyper-inflation occurs.

Once such a theory is officially recognized, however, many epigones throng around it and deify it. This deification was the case with Marxism. But I think the reality before us is the very teacher that teaches us lessons of economics. The fact that more than 100 years have elapsed since Volume 1 of "Das Kapital" was published is significant enough. In this context, I think it may be possible to propose a tentative assumption that the conventional theory of value of labour can be replaced by a new theory of *human worth* or *a supranational quality of life standard* to replace

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the material gold standard.

There is no gainsaying that Marx's foresight was wrong in light of the current state of socialist nations. Someone may argue that midcourse correction as is seen in China is not contrary to the principles of Marxism. Even in capitalist nations the shock of Marxism, particularly its forecasting feedback effect, has been helpful in their preventing revolutions and thereby promoting economic progress.

At any rate, it can safely be said that Marxism is one of the most influential economic theories in modern history. It is resurrected whenever a world cataclysm occurs, because it means that its elements are built in some human natures. It is indeed a very fascinating way of thinking.

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POVERTY: CONCEPT, MEASUREMENT AND RE-ORIENTED STRATEGY FOR ITS ALLEVIATION

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Ever since the beginning of the planning era, the removal of poverty and raising the level of living of the masses has been, in one form or other, one of the main objectives of the nation's successive Five Year Plans. It was, however, in the Fifth Plan (1978–83), when the word 'Poverty' was for the first time specifically introduced and 'Removal of Poverty and attainment of economic self-reliance' was enunciated as one of the two basic objectives of the Plan. In fact, in a developing economy, and more so in a welfare state like ours, poverty removal programmes must be the hub of the plan objectives. In the present paper an attempt has been made to give a critical analysis of the concept, measurement, magnitude of the problem, development programmes in operation to resolve it and strategy and content of the programmes that ought to be undertaken, with a view to eradicating or considerably reducing the menace of poverty. Before sharply focussing the strategy and content of the programmes for alleviation of poverty, it appears to be more appropriate to discuss first the concept and measurement of poverty, magnitude of incidence and the programmes for removal or rduction of poverty and the lacunae that are eating out the very roots of the programmes. Efforts have also been made to present pinpointedly as to what reorientation in the strategy and content of poverty alleviation programmes is needed, so that a real dent on the level of living of the poorest of the poor could be effected, through drastic change in the content and implementation of the poverty removal programmes, keeping in view the shortcomings brought to surface by field studies carried out by national and State level renowned institutions.

Concept

Poverty in general connotes deficiency or insufficiency of acceptable material needs of the people. It can cover a range from extreme want of necessities resulting in debility due to malnutrition to falling short of having comfortable means, which may conceptually be categorised as absolute and relative. As a matter of fact, poverty in India is treated as an absolute phenomenon. The needs have often been expressed in terms of a basket of food items, satisfying certain desirable calorie requirements.

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the minimum income or consumption expenditure, which enables one to attain this basket, is known as poverty line. But, in reality, there is a great difference of opinion on finding either the energy norms or the monetary equivalent of it due to the regional and demographic variation in the population of India.

Poverty Line: A Historic Review

Since a very long past, the subject of precisely working out the poverty line has been engaging the serious attention of economists, statisticians and other social scientists. The question of defining a poverty line was, however, first mooted by the Indian Labour Conference in 1957. A distinguished Working Group was set up by the Planning Commission, Government of India, in July 1962 to deliberate on the question of what should be regarded the nationally desirable minimum level of consumer expenditure. The Working Group appears to have taken into account the recommendations for balanced diet made by the Nutrition Advisory Committee of the Indian Council of Medical Research in 1958, and came to the view that in order to provide the minimum nutritional diet in terms of calorie intake and to allow for a modest degree of items other than food, the national minimum consumption expenditure for a household of five persons should not be less than Rs. 100 per month at 1960–61 prices, i.e. Rs. 20 per capita per month. The Group suggested that for urban areas the minimum should be raised to Rs. 25 per capita in view of the higher cost of living there. By implication, this meant that the corresponding amount in the rural areas would work out to Rs. 18.9.

In a study conducted by Dandekar and Rath in 1971, an intake of 2250 calories per capita per day was assumed as adequate under Indian conditions, both in rural and urban areas. On the basis of National Sample Survey data on consumer expenditure, the study revealed that an average annual per capita expenditure of Rs. 170.8 or equivalently Rs. 14.2 per capita per month at 1960–61 prices would suffice to meet these calorie requirements in the rural areas. The corresponding figures in the urban areas were Rs. 271.4 and Rs. 22.6 at 1960–61 prices. Referring to the recommendations of the Working Group, set up by the Planning Commission, the authors observed that the basis of determination of poverty line by the Working Group was not known and also the Working Group did not make a distinction between rural and urban cost of living. They felt that the rural minimum determined by them was considerably below that proposed by the Group, while the urban minimum determined by them was little above that recommended by the Group. In view of this, they decided to revise their rural minimum slightly upwards to Rs. 180 per annum or Rs. 15 per month. Similarly, they rounded off the urban minimun to Rs. 270 per annum or Rs. 22.5 per month both at 1960–61 prices.

Sukhatme (1965) initially estimated a poverty line considering the

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recommendations of Food and Agricultural Organisation, United Nations and NAC regarding minimum dietary pattern, availabilities, etc. Later on (1977) he rejected the concept of average nutritional requirements and estimated a poverty line taking into accout the minimum requirement of calorie intake as against average requirement in terms of what he calls 'reference man', based on nutritional findings derived from average requirements of calorie intake. He felt that average claoric requirement did not represent the minimum below which an individual can be treated as under-nourished. But the problem rests with the fact that with the available data, any analysis can be carried out only on the basis of mean consumption expenditure level and not on the consumption of the individuals. Moreover, for all sorts of planning purposes, and to have an idea about the energy deficiency, the concept of average requirement of calorie is found to be a better criteria than the concept of minimum requirement, as suggested by Sukhatme.

Almost simultaneously, Bardhan (1971), Rudra (1973) and others forwarded different poverty estimates at regional level, mainly depending on the norms prepared by the Working Group of Planning Commission in 1962. Prof. Raj Krishna estimated the number of people below poverty line, Statewise, with a view to use then in the allocation of the Central fund under the Gadgil Formula. For this purpose, he used the All-India poverty norm determined by Dandekar and Rath and converted them into State specific poverty norms (at 1960–61 prices), using State price indices. The State index of rural consumer prices in 1960–61, prepared by Bardhan (1971) on the basis of the study "Between States' variation in consumer prices" by Chatterjee and Bhattacharya (1969), was utilised for converting the all-India rural norm. It may be mentioned that Chatterjee and Bhattacharya had constructed indices of consumer prices for the rural areas of different States by fractile groups using NSS 18th Round (1963–64) data. Three years (1961–63) average of the working class consumer price index was utilised to convert the all-India urban norm into State specific norms. Then, the State specific poverty lines in rural areas were converted to current prices using the consumer price index for agricultural labourers. In a similar way, the urban poverty lines for the States were converted by the consumer price index of working class.

Raj Krishna's study also takes into account another major dimension in assessing poverty, viz., the role of public consumption in measuring welfare or deprivation. Accordingly, he estimated what he defined an 'Augmented Poverty Line', which he derived adding an estimate of the benefit of public expenditure to the private expenditure norm. For this calculation, he classified the public expenditure on monthly per capita basis for all States under six heads, viz., Health and Family Planning, Water Supply and Sanitation, Education, Administration of Police, Jails and Courts, Roads, and Social Welfare. But the major lacunae in tackling the

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public expenditure was that its distributions among different expenditure groups were not available. As an easy alternative, he made the basic assumption that the benefits of this expenditure were equally spread over the population. Therefore, the actual public expenditure (per capita monthly) was added to the actual private monthly per capita expenditure of each class for the State. Finally, utilising NSS consumer expenditure data for 25th Round (1970–71), Statewise poverty ratios were estimated.

A quantitative index of poverty has been formulated by the Planning Commission for its planning exercise in the "Report of the Task Force on Projections of Minimum Needs and Effective Consumption Demand" set up in 1977, where poverty line is defined as the mid-point of the monthly per capita expenditure class having a daily calorie intake of 2400 per person in rural areas and 2100 in urban areas. The poverty line thus determined may evoke some uniqueness compared to the earlier ones in the way that it takes care of the population distribution in terms of age, sex and activity—the three major determinants of the calorie needs of the individuals.

Calorie norms worked out above may be subject to bias attributable to a number of factors, some tending to push it upwards and others downwards. These estimates understate the 'true calorie' requirements to the extent additional allowances are actually needed by workers among children and adolescents below the age of fifteen years. On the contrary, to the extent workers do not work with full intensity, these estimates will tend to overstate the true calorie requirements, more so in rural areas, where underemployment and disguised employment preponderate.

The poverty line for these norms, as estimated with the application of "Linear inverse interpolation method" to the average per capita montly expenditure and the associated calorie content of food items from National Sample Survey data on consumer expenditure of 1973–74 (28th Round), works out to be Rs. 49.09 and Rs. 56.64 per capita per month in rural and urban areas respectively.

Sixth Plan Estimates of Poverty Line

In the sixth Plan, the poverty line was defined as the mid-point of the monthly per capita expenditure class, having a calorie intake of 2400 per person in rural areas and 2100 in urban areas. In terms of 1979–80 prices, the midpoints corresponded to Rs. 76 in rural areas and Rs. 88 in urban areas, as given in the Plan document. The basic data utilised for building up these estimates are from the consumer expenditure surveys of the National Sample Survey Organisation (NSSO). The population having a per capita expenditure below this level has been considered to be poor.

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Limitations of the Estimates

The following are the main limitations of estimation procedure:

(i) Only age, sex and occupation differentials were taken into account in the determination of daily calorie requirements of the population. Body weight is not considered. It is assumed that calorie norms are the same for a specific age, sex and occupation group. Occupations are grouped under three categories—heavy, moderate and sedentary. This assumption is really not based on concerte data base. Sukhatme has, of late, advocated that the average energy requirement of an individual should not be taken as his minimum requirement, because energy needs vary between and within individuals even of the same age, sex, occupation group and for the same individual over time.

(ii) Linear relationship has been assumed between per capita monthly expenditure and per capita per diem energy intake. As against this, interpolation method or alternatively theoretical probability model, viz., *displaced log-normal distribution* to describe the observed distribution of population by monthly per capita expenditure classes could be utilised (Joshi-Sarvekshana, July 1979) for estimating the poverty ratio.

(iii) The NSSO data on calorie intake have been utilised, with the assumption that average intake per capita for an expenditure group is an indicator of the nutritional status of the population of that group. This is assumed to be true for all expenditure groups, while this could be legitimately questioned for the top and bottom groups.

(iv) Consumer expenditure has been taken as a proxy variable for income.

Inclusion of Non-Food Items also Essential in Working Out Poverty Line

While the above exposition makes it clear that poverty line, in terms of money determined as above, is not only a function of calorie intake but also of non-food expenditure, there is a basic question: why should not the calorie intake criterion be interpreted to give the incidence not of poverty but of under-nutrition as proof? Basic needs of an individual are not only to have proper nutrition and health but also other basic amenities like housing, clothing, education, etc. This suggests that a proper measurement of poverty should have normative yardsticks not only for nutrition requirements, but also for other basic needs like housing, clothing, education and employment. The 'Poverty line basket' is really to be defined. The basic issue is whether the poverty ratio as calculated, is a good enough measure of physical quality of life in terms of these needs.

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Limitation of Consumer Expenditure Data of NSS

While using the consumer expenditure data from the NSS for poverty ratio, few other points have to be kept in mind. The N Sample design, as adopted in these rounds, is more susceptible to underestimation of the consumption of the rich in the upper fractiles. Further, the data, as collected, do not impute for the consumption of free goods like forest products collected freely from the forests and used as fuel. There is also the danger that the wage goods received in kind and consumed at home may not be fully taken into account in the data collection.

It should also be appreciated in this context that consumer expenditure data of the NSSO covers only household expenditure, i.e., private expenditure. The social consumption portion (i.e., the expenditure which society/government incurs for making available facilities in the fields of health, education, transport etc., through subsidy (and to that exent the private expenditure of the beneficiaries is less) are not imputed in the NSS consumer expenditure estimates. Utilisation of these data in the above calculations, therefore, gives really the upper bound of the percentage of the poor.

Projection of Poverty Line

For using the poverty line calculated for 1973–74 for any future year there is a problem of appropriate price deflator. It is more appropriate to use the deflators which represent the consumer basket, which is possible only by identifying the basket of food actually consumed in these expected years. But taking the same consumer basket for all years presumes there is no change in the tastes and preference over time. The wholesale price indices have been used for this purpose at all-India level.

As against the wholesale price index often the consumer price index of agricultural labour is suggested for updating the rural poverty line and the consumer price index number is suggested for updating the urban poverty line. It is appropriate not to use any of the above, mainly because of two reasons: (a) these two indices are based on the weighting diagram, as early as 1957, while that of wholesale price index relates to 1970–71, and (b) the scope and coverage of the above indices are much less as compared to wholesale price index. Consumer price index is based on the price quotation for only 56 urban centres of the country. Similar is also the case with agricultural labourer price index. On the contrary, the whole price index is based on the price quotation for more than 70 centres of the country. Using the norms of 2400 and 2100 calories for rural and urban areas respectively and using the data for 1977–78 and 1972–73, Gupta, Singh and Datta of the Planning Commis-

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sion, Government of India, have calculated the poverty line for these years by *inverse linear interpolation*, as explained earlier. The results are presented in the table below :

		1973–74	1977–78	Implict deflator
Poverty line	Rural	49.09	61.08	1.24
	Urban	56.64	69.89	1.23
Wholesale Price Index		—	—	1.33
CSO Private Consumption Deflator		—	—	1.24

It can be seen that implicit price deflator of poverty line is close to the deflator of CSO private consumption and not very far from the wholesale price indices for these two years.

Statewise Estimates of Poverty

The estimates of poverty level by different economists were prepared using different concepts of poverty line, for all India, the latest being those contained in the nation's Sixth Five Year Plan (1980–85) based on the 32nd round of the NSS data. However, Statewise break-up of poverty estimates with changes over time were first systematically provided by Ahluwalia, who had used the NSS data from 1957–58 (13th round) to 1973–74 (28th round). These estimates are for rural poverty assuming the poverty line at Rs. 15 per person per month at 1960–61 prices. Changes over time have been accounted for using the consumer price index of agriculture labour as the deflator. The all-India estimates have been arrived at as a weighted sum of the estimated percentages in individual States.

In connection with the estimates of poverty, it is important to mention Amartya Sen's measure, which takes into consideration the average shortfall of a person's expenditure below the poverty line and its distribution among the poor and enables one to have an insight into the increase or decrease in the extent of poverty amongst the poor. Ahluwalia had built up Statewise estimates in terms of Sen's measures of poverty.

Sen's measure of poverty (Z) is given by

$$Z = \frac{2}{(q+i)n^{\varpi}p} \sum_{i=1}^{q} (x_p - x_i)(q+1-i)$$

where n is the population size, x is the expenditure of the ith individual arranged in ascending order of magnitude, q the number of people

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at or below the poverty line and x_p the minimum acceptable level of expenditure of poverty line.

As already mentioned, estimates of poverty for different States, prepared by Raj Krishna for 1970–71 on the basis of 'Augumented Poverty Line' (APL), which takes into account the per capita public expenditure on basic needs is worth quoting here.

Poverty Estimates: Efforts made in U.P.

Besides the above estimates, a few other estimates prepared in U.P. are worthwhile to be mentioned. Efforts in the direction of preparing poverty estimates in the State began in 1976 when Perspective Planning Division of the State Planning Institute, U.P. in its document 'Perspective of Development of Uttar Pradesh—A Frame: 1974–75 to 1988–89', brought out that 65.65 per cent of population in 1968–69 was below the poverty line. In this estimate, per capita monthly expenditure of Rs. 20 at 1960–61 prices was taken as the poverty norm and NSS data published in Report No. 251 of the 23rd Round of NSS were made use of.

The State Planning Institute, U.P. prepared another estimate based on the poverty line defined in terms of minimum nutritional requirements, i.e. 2400 calories per day per person for the rural areas and 2100 calories for the urban areas. This estimate related to the year 1977–78. On the basis of the calorie norms and using the NSS data of the 28th round for the year 1973–74 for U.P. and applying the *Inverse-Linear Interpolation* between the average per capita monthly consumption expenditure and calorie requirements. The per capita monthly requirements were worked out to be Rs. 67.75 and Rs. 69.98 at 1976–77 prices, for the rural and urban areas respectively. Against this, the corresponding levels for all-India were Rs. 61.80 and Rs. 71.30. The difference in the levels of U.P. and India were due to variations in the consumption basket and price levels. This placed absolute poverty at 57.06 per cent in rural areas and 45.94 per cent in urban areas in U.P. in 1977–78. The corresponding estimates for the country were 47.85 and 40.41. The poverty percentage in U.P. stood higher both in rural as well as urban areas as compared to all-India.

The latest estimate* of poverty for Uttar Pradesh has been worked out by the Perspective Planning Division of the State Planning Institute, U.P. and it pertains to the year 1984–85. The same nutritional norms as used for 1977–78 were assumed in this exercise also. However, latest NSS data on consumer expenditure of 32nd round were used. The cut-off points in respect of per capita monthly expenditure were worked out at

**Draft Seventh Five Year Plan and Annual Plan 1985–86*, Vol. 1, Government of Uttar Pradesh, p. 50.

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Rs. 91.83 for rural areas and Rs. 108.48 for urban areas (both at 1984–85 prices). The percentage of population below the poverty line was estimated to be 43.25 for rural areas and 40.71 for urban areas and 41.08 for the State as a whole for the year 1984–85.

Magnitude of Incidence of Poverty

The latest estimates about the number of persons living below the poverty line are for the year 1984–85. As per these estimates (given in Table 1) the total population living below the poverty line works out to 272.7 millions in 1984–85. The break-up of rural and urban is 222.2 millions and 50.5 millions respectively. This shows that 81.5% of the total poor live in rural areas and the remaining 18.5% in urban areas. The temporal analysis reveals that the processes of economic growth and antipoverty programmes have made some dent on the problem of poverty. During the period 1977–78 to 1984–85, 34.1 million people crossed the poverty line and the poverty percentage reduced from 48.3 in 1977–78 to 36.9 in 1984–85. There has been a decline of 12.3% during 1977–78 to 1984–85 in the rural areas and 6.0% in the urban areas and the total change was 11.1% in terms of absolute number of persons living below the poverty line. The number of poor pulled up from the poverty line during the period 1977–78 to 1984–85 from rural and urban areas were 30.9 millions and 3.2 millions respectively. The analysis, thus, indicates that the reduction in poverty has been much more in rural areas than in urban areas.

TABLE 1

POPULATION BELOW POVERTY LINE (INDIA)

Rural/Urban	Number (million)			Percentage of persons below poverty line (%)		
	1977–78	1984–85	Percentage change	1977–78	1984–85	Percentage change
1	2	3	4	5	6	7
Rural	253.1	222.2	(−)12.3	51.2	39.9	(−)22.1
Urban	53.7	50.5	(−) 6.0	38.2	27.7	(−)27.5
Total	306.8	272.7	(−)11.1	48.3	36.9	(−)23.6

Source: *Seventh Five Year Plan (1985–90)*, Vol. 1, p. 33, Government of India, Planning Commission.

Note: Estimates for 1977–78 are based on 32nd Round of NSS (1977–78 revised) and that of 1984–85 on 38th Round (1983–, provisional).

The inter-State comparative picture of the changes in the poverty ratio and the number of persons crossing the poverty line during the period 1977–78 to 1983–84 has been presented in the Appendices I and II.

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It emerges from the analysis of the contents of these Appendices that the highest reduction in poverty ratio was witnessed by Tripura, followed by Assam, Orissa and Kerala. It is discouraging to note that the economically too depressed States of U.P. and Bihar had a dismal performance, so far as reduction of poverty ratio was concerned. It is something striking to note that the reduction in poverty ratio was the least in Punjab, which has the highest per capita income among all the States of the country. So far as the absolute number of persons pulled up from the poverty line was concerned, the performance of Maharashtra was the best, where the maximum number of persons (64.2 lakhs) were brought above the poverty line during the period 1977–78 to 1983–84. The next in order were Kerala (45.6 lakhs) and Orissa (44.6 lakhs). It is disturbing to observe that in the States of Bihar, Rajasthan and Uttar Pradesh, the number of persons below the poverty line, instead of decreasing, have, in fact, increased in 1983–84, as compared to that in 1977–78. The most dismal performance was witnessed in Uttar Pradesh, where the number of poor had increased by 24.6 lakhs during the period.

Identification of 'The Poor'

Another significant aspect related to poverty problem is the identification of the poor. In the context of formulating suitable and "Target Group" specific strategy, so as to make any meaningful dent on the problem in question, the importance of identification of the poor hardly needs any elaboration.

Some of the economists, who have estimated poverty for the country as a whole and for individual States, have also attempted to identify the really poor or those below the poverty line. Worth mentioning in this context is Minhas, who quantified the poor at all-India level in broad occupational categories, viz., agricultural labour, non-agricultural labour, landless labour and small and marginal farmers. Similar attempt has been made by Kurien for Punjab. These attempts are only indicative and call for in-depth investigation into the matter, which could enable one to identify and quantify the poor not only on economic criterion i.e. in accordance with their sources of income and employment but also on the basis of some vital social aspects such as caste, education, etc. Also, such attempts are required at the micro-level so that micro-planning, being so highly emphasized, may be fruitfully and purposefully implemented. This fact has also been recognized by the Expert Group on Programmes for Alleviation of Poverty, constituted in March 1981, under the Chairmanship of Dr. M. S. Swaminathan. The Group has emphasized the need of identifying the poorest families and offered specific suggestions in this regard. The Group felt that the best method of identifying the poorest families in a village would be to make the selection in open meeting of the Gaon Sabha/Village Community.

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Poverty Alleviation Programmes in Operation—An Objective Assessment

In consonance with the Plan objective of raising the level of living of the poor and pulling them up from the morass of poverty, a number of development programmes are in operation which, by and large, mainly aim to provide employment to the persons living below the poverty line, since it is considered that through providing employment to this cross section of the population, a source of income would be generated for them and would, thus, enable them to rise up from the existing subsistence living. Among these poverty alleviation programmes, the Integrated Rural Development Programmes (IRDP), National Rural Employment Programme (NREP) and Rural Landless Employment Gurarantee Programme (RLEGP) deserve special mention. Though much fuss has been made of the benefits accruing from these programmes but, as the things obtain today, these programmes are yet to make a real dent on the objective with which these were launched. In the succeeding paragraphs we have attempted to give a critical assessment of the present working of these programmes along with specific suggestions as to what ought to be done, so that these programmes are able to achieve the objectives, both in letter and spirit, for which they were launched.

National Rural Employment Programme

The National Rural Employment Programme was launched in December 1980 in place of the erstwhile programme of 'Food For Work'. This programme too had the same objectives as those of the Food For Work Programme. The basic objective of this programme was to create gainful employment opportunities for unemployed and underemployed persons of the rural areas. It also aimed at strengthening the infrastructural facilities in rural areas, through construction of public utility assets. It, thus, emerges from the very objective of the programme that two conditions are necessary to be fulfilled before initiating this programme. Firstly, the proposed schemes must create permanent assets and, secondly, the expenditure against labour and material components of the schemes included in the programme should have a ratio of 60 : 40 respectively.

The Evaluation Division of the State Planning Institute, U.P. had conducted an Evaluation Study of this programme in the year 1983 and had, accordingly, brought out a Study Report in this connection. The report brings to surface some of the limiting factors and the main bottlenecks coming in the way of successful operation of the programme. It has been observed in the Evaluation Report that the specific conditions mandatory for launching the programme, viz., construction of permanent assets, 60 : 40 ratio in labour and material components, at least 10% expenditure on the works specifically benefiting the weaker sections, at least 10% expenditure on afforestation, etc., have practically made the

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selection of the appropriate construction works a very difficult task. Some of the conditions are mutually contradictory like construction of permanent capital assets tagged with the condition of 60 : 40 ratio in expenditure against labour and material respectively. All concerned were of the opinion that it is rather impossible to construct permanent capital assets by maintaining a ratio of 60 : 40 in labour and material.

The rate of wages to labourers is another major factor adversely affecting this programme. It is difficult to arrange and maintain the required number of labourers with the existing wages. The wages, fixed for labourers working in this scheme, are less than those of the corresponding wages in some departments. In all districts the wage rates were lower than the fixed ones, with the result that only those labourers are willing to work under this scheme who are unable to find employment anywhere else. The workers engaged in this scheme are, by and large, women and feeble males, whose productivity is generally lower than that of an average worker.

There is an imperative need for determining the priorities among the programmes eligible for inclusion in this scheme. The priorities should be decided taking into consideration the felt needs of the area and potentials of employment. Only those works should be taken up which are labour-intensive and are actually desired by the local people. Village link roads, soil conservation, construction of tanks and bundhies, afforestation programmes should be accorded priority, as these programmes are based on the felt needs of the local people and are also labour-intensive.

What Ails Intensive Rural Development Programmes (IRDP)

Since 1970 a number of rural development programmes have been in operation with a view to alleviating poverty by increasing income and employment. Of these programmes, Integrated Rural Development Programme, which accounts for nearly 49.2 per cent (Rs. 3473.99 crores) out of the total Seventh Plan Rural Development investment of Rs. 8448.83 crores, is the biggest one.

The Seventh Plan not only increased the allocation to Rs. 3474 crores from Rs. 1661 crores in the Sixth Plan, but also defined the poorest of the poor as those having an annual income of Rs. 4800, which is substantially lower than the cut off income of Rs. 6400 but higher than the Sixth Plan definition of Rs. 3500 per family. The Seventh Plan recommends that cost-effectiveness of these programmes and minimisation of leakage should be the two guiding principles in the implementation of poverty alleviation programmes. These programmes should be formulated and implemented in a decentralised manner with the participation of the people at the grassroots level through village panchayats.

A number of institutions such as Reserve Bank of India, Programme

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Evalutation Organisation, NABARD, etc. have studied the IRDP programme on the basis of the experiences of the first one or two years. Taking these into account G. V. K. Rao Committee has made certain recommendations with far reaching consequences.

G. V. K. Rao Committee has rightly recommended that the local initiative must be encouraged by involving the people effectively in drawing up programmes of rural development. The Committee recommended that the Panchayat Raj bodies have to be activised. As the Committee has rightly pointed out, the Block Development Officer has become ineffective and the credibility of the Organisation has been eroded. The observation made by the Committee about B.D.Os. is in line with the recommendation made by the Programme Evaluation Study. The Committee has also observed that the cooperatives have not kept pace with the ever increasing credit requirements of agriculture and rural development. The entry of commercial banks into the field of credit has in no way proved better. In fact commercial banks are much more security-conscious than cooperatives.

Taking into account the empirical studies done by national level organisations, the G. V. K. Rao Committee has made two important observations. Firstly, the planning component of individual programmes is found to be weak. Secondly, IRDP kind of asset-based programmes have a trend towards corruption. While agreeing with these two suggestions, it would be difficult to fully agree with the other suggestion of the Committee that the subsidy given to IRDP beneficiaries should be removed and, instead, the beneficiaries should be given easy terms of credit at low interest rates. No doubt the subsidy element has given rise to corruption. All the same complete withdrawal of subsidy will not solve the problem. As regards subsidy, it has been pointed out by the Programme Evaluation Organisation that in some areas the subsidy was not adjusted immediately after providing assets to beneficiaries with the result that the beneficiaries had to pay interest even on the subsidy portion of the cost of assets. What is important is that subsidies are given on a selective basis with administrative efficiency, so that there is no misuse of subsidies.

Even the commercial banks have not been found useful. According to PEO Study, in a large number of cases loan applications were rejected on flimsy grounds. The rejection rate in Sangrur district of Punjab was 70 per cent. Due to these reasons and their being security-conscious, it would be difficult for the commercial banks to participate in a big way in giving agricultural credit.

The IRD programme was initiated in a large number of districts without the necessary preparatory work. According to the Programme Evaluation Organisation Study, nearly 70 per cent of the selected districts reported inadequacy of administrative and banking infrastructure and

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supporting services to provide assets to beneficiaries.

Excepting in Karnataka, where identification of beneficiaries was done after conducting a detailed house to house survey, in most of the States beneficiaries were selected from the master list of Small Farmers Development Agencies (SFDAs) and Marginal Farmers and Agricultural Labourers Development Agencies (MFALS). According to the PEO study, many of the States had not introduced Vikas Patrika to be given to each beneficiary for monitoring of the impact of the IRDP Scheme.

About the extent of benefits from the IRD Programme, there are differences between the findings of the Programme Evaluation Organisation and the concurrent evaluation carried out by 29 research institutions, on behalf of the Ministry of Rural Development. While the Programme Evaluation Organisation Study covers the period upto March 1983, the concurrent evaluation covers the period Oct.–Nov. 1985. According to the PEO Study, about 90 per cent of sampled households expressed the view that as a result of the IRDP scheme their income and family employment had improved and 77 per cent of selected households reported that their consumption level had increased. It was also reported that 49.4 per cent of the households were able to achieve an annual income level of Rs. 3500 and above and about 26 per cent of sampled households were above Rs. 3500, even before the scheme started. Only 22 per cent households felt that the scale of financial assistance available under the scheme was inadequate.

While PEO study shows that in agriculturally prosperous areas, 60 per cent of the respondents considered that the quantum of admissible financial assistance was inadquate to enable the target families to cross the poverty line, the concurrent evaluation shows that in case of 79 per cent of beneficiaries, the assistance was sufficient to acquire the assets under the scheme. The concurrent evaluation reveals another interesting information that almost invariably the value of assets assessed by the beneficiary was lower than as per record.

Pioneering study in the field of IRDP was conducted by the NABARD. The NABARD study shows that the extent of leakage was 26 per cent and the animals selected under the animal husbandry programme were of poor quality. In all States income generation was decidedly better for minor irrigation schemes. The average incremental income that accrued as a result of participation in IRDP worked out to Rs. 1616.

All the evaluation studies and the report of the G. V. K. Rao Committee came to the same conclusion that all was not well with the IRD Programme. The beneficiary oriented approach of the IRDP has not served the purpose for which it was started, as the benefits in a large number of cases were going to the wrong type of households for whom the programme was not meant. There is, therefore, an imperative need

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for drastic reorientation in the operation of the programme and the pilferages have to be completely checked by adopting remedial measures. The outlook of bank personnel associated with the advance of funds needs to be substantially changed from the existing rigid one to an accommodating and helping one.

Rural Landless Employment Guarantee Programme (RLEGP)

This programme is the latest one in the series for alleviation of poverty in the rural areas. The programme was introduced from 15th August, 1983, with the objective of (a) improving and expanding employment opportunities for the rural landless with a view to providing guarantee of employment to at least one member of every landless household upto 100 days in a year, and (b) creating durable assets strengthening the infrastructure, so as to meet the growing requirements of the rural economy. Thus, the Rural Landless Employment Guarantee Programme (RLEGP) has been started with the dual objective of expanding employment opportunities in rural areas and providing sharper focus on the landless labour households, which constitute the hard core of the people below the poverty line. As in the case of NREP, wage and material cost ratio will be 50 : 50. It is important to pinpoint that in the series of programmes launched with a view to considerably reducing the incidence of poverty, RLEGP is the first programme, which provides a guarantee for employment to the rural landless labourers. The wages to the labourers engaged in the works under this programme are to be given in cash as well as in kind, i.e. in the shape of wheat. An outlay of Rs. 1743.78 crores for the country during the Seventh Plan has been provided for RLEGP to be borne entirely by the centre. Based on the average wage of Rs. 8.61 per day as in 1984–85 and a wage-material cost ratio of 50 : 50, a total employment of 1013 million mandays is likely to be generated during the Seventh Plan, at an average rate of around 200 million mandays per annum.

There are a number of lacunae in the programme content as well as in the operational aspects, which are putting a great hurdle in achieving the objective for which the programme was initiated. Some of the important lacunae in the programme are briefly enumerated below:

(1) There is no systematic selection of villages for field operation of the programme. Besides, no survey has been done to identify the unemployed. It is suggested that only those villages should be selected for this programme which are predominantly inhabited by scheduled castes and landless labourers as these, by and large, form the bulk of unemployeds in the rural areas. Before launching the programme in an area, it is imperative, first of all, to identify the unemployed persons. This is necessitated because of the fact that experience of implementation of this programme in the past has revealed that the required number of persons

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were not available to work on the project, as no prior survey was done to assess the magnitude of unemployeds in the areas. Remedial measures are needed to plug these loopholes.

(2) It was specifically laid down in the objective of the scheme that it would guarantee employment to at least one member of every landless household up to 100 days, but as the things obtain today, no record is being maintained to ensure that the beneficiary got employment of 100 days in a year. It is, therefore, necessary that cards may be issued to each beneficiary and entries of number of days worked may be mentioned in the card, so that it may be assessed as to how many days in the year the beneficiary got employment through this scheme.

(3) The intensive field visits have revealed that employment through this scheme is, by and large, provided in the peak agricultural seasons, whereas the objective of the scheme was to provide employment during bleak agricultural season. The main reason for intensifying the works on the projects in such peak seasons is the utilisation of funds allotted at the fag end of the financial year i.e. in the month of March. What is, therefore, needed is early sanction of the project, so that work may be started well in time.

(4) One of the main difficulties with the beneficiaries working under this scheme is with respect to the mode of payment: 4 kg. wheat daily and the remaining wages in cash. Firstly, the workers show reluctance in obtaining wages in the form of 4 kg. wheat per day because these poor people, who have subsistence living and entirely depend on what they earn daily, get much disappointed and disgusted when after doing hard manual labour throughout the day and, thereafter, travelling on foot a number of kilometres they go to the grainshop for obtaining wheat as daily wages and find the shop closed. Moreover, the storage problem of the grains received as wages further aggravates the situation. In addition, the labourers in eastern U.P., who are predominantly rice-eating people, naturally prefer to have cash as wages instead of wheat, as rice is not distributed as wages. What is, therefore, needed is that no string of foodgrains be attached to the payment of wages.

(5) The wage paid to the workers engaged in the projects under this scheme is Rs. 11.50 per day, which is lower than the prevailing wage rate and is much less than the rate in the Western Region, where the general wage rate is Rs. 15.00 per day. For the successful working of the project and to attract the required number of labourers, it is essential that the wage rate, in no case, is less than the existing wage rate in the area. It is, therefore, recommended that the wage rate for RLEGP work should, in no case, be lower than the rate prevailing in the area.

Concluding Remarks

It, thus, emerges from the foregoing critical analysis of various aspects of

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the poverty problem that though the measurement of poverty line and quantification of the people living below the line, using sophisticated empirical tools, is no doubt quite vital, but what is much more important is the identification of the real poor and more so of the poorest of the poor and a drastic reorientation in the existing content of the poverty programmes and the implementing procedure and its machinery. The lacunae in the identification of the really poor ones and in the development programmes that are in operation for alleviating poverty, about which a critical appraisal has been given in the previous pages, have necessarily to be wiped off. These programmes have to be operated on a war footing and in such a fashion that their benefits are received only by the poorest of the poor. What is urgently needed is to effect a real rise in the income of the most unprivileged cross section of the society, which is living in utterly abject poverty, because those living just below the poverty line would, in all likelihood, be able to cross it in due course of time, as a result of multiplier effect of various development programmes meant to raise the income of the poor. *In order to change the existing scenario of abyssmal poverty of rural masses and giving them a ray of hope that days are not far away when they will also see the smiling faces of their children, the strategy, content, procedure, conditions, implementation machinery etc. of the poverty alleviation programmes will have to be restructured in the fashion, as suggested in this paper, otherwise the parrot-like slogan of planners and policy-makers of pulling up the rural masses from the quagmire of poverty and raising the level of their living, enshrined in the main objectives of the successive Five Year Plans, would ever remain a myth and nothing short of it.*

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APPENDIX 1

PERCENTAGE OF POPULATION BELOW THE POVERTY LINE

Sl. No.	State	Percentage of population below the poverty line 1977–78			Percentage of population below the poverty line 1983–84			Reduction of population below the poverty line during 1977–78 to 1983–84		
		Rural	Urban	Combined	Rural		Combined	Rural	Urban	Combined
1	2	3	4	5	6	7	8	9	10	11
1.	Andhra Pradesh	45.4	37.2	43.6	38.7	29.5	36.4	6.7	7.7	7.2
2.	Assam	48.5	36.5	47.3	23.8	21.6	23.5	24.7	14.9	23.8
3.	Bihar	57.8	44.8	56.3	51.4	37.0	49.5	8.4	7.8	6.8
4.	Gujarat	43.1	29.8	38.9	27.6	17.3	24.3	15.5	12.5	14.6
5.	Haryana	23.2	32.5	25.2	15.2	16.9	15.6	7.6	15.6	9.6
6.	Himachal Pradesh	27.8	17.2	27.0	14.0	8.0	13.5	13.8	9.2	13.5
7.	Jammu & Kashmir	31.7	40.5	33.4	16.4	15.8	16.3	15.3	24.7	17.1
8.	Karnataka	53.2	44.6	50.8	37.5	29.2	35.0	15.7	15.4	15.8
9.	Kerala	47.4	53.2	48.4	26.1	30.1	26.8	21.3	23.1	21.6
10.	Madhya Pradesh	61.6	46.9	58.9	50.3	31.1	46.2	11.3	15.8	12.7
11.	Maharashtra	60.4	31.4	50.6	41.5	23.3	34.9	18.9	8.1	15.7
12.	Manipur	29.2	26.8	28.7	11.7	13.8	12.3	17.5	13.0	16.4
13.	Meghalaya	51.2	28.6	47.4	33.7	4.0	28.0	17.5	24.6	19.4
14.	Orissa	67.9	41.8	65.1	44.8	29.3	42.8	23.1	12.5	22.3
15.	Punjab	13.1	25.6	16.4	10.9	21.0	13.8	2.2	4.6	2.6
16.	Rajasthan	33.5	33.9	33.6	36.6	26.1	24.3	(−)3.1	7.8	9.3
17.	Tamil Nadu	56.3	45.3	52.8	44.1	30.9	39.6	12.2	14.4	13.2
18.	Tripura	64.5	27.5	60.5	23.5	19.6	23.0	41.0	7.9	37.5
19.	Uttar Pradesh	49.8	49.2	49.7	46.5	40.3	45.3	3.3	8.9	4.4
20.	West Bengal	58.3	34.5	52.2	43.8	26.5	39.2	14.5	8.0	13.0
21.	Nagaland, Sikkim and all Union Territories	41.5	10.1	21.1	47.4	17.7	27.1	(−)5.9	(−)7.6	(−)6.0
	All India	51.2	38.2	48.3	40.4	28.1	37.4	10.8	10.1	10.9

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APPENDIX II
NUMBER OF PERSONS BELOW THE POVERTY LINE

(in Lakhs)

Sl. No.	State	1977–78			1983–84			Number of persons brought above the poverty line during 1977–78 to 1983–84		
		Rural	Urban	Combined	Rural	Urban	Combined	Rural	Urban	Combined
1	2	3	4	5	6	7	8	9	10	11
1.	Andhra Pradesh	176.8	40.6	217.4	164.4	40.7	205.1	12.4	−0.1	12.3
2.	Assam	78.0	6.4	84.4	44.9	4.9	49.8	33.1	−1.5	34.6
3.	Bihar	330.5	33.7	364.2	329.4	36.1	365.5	1.1	−2.4	−1.3
4.	Gujarat	94.6	27.5	122.1	67.7	19.9	87.6	26.9	7.6	34.5
5.	Haryana	22.0	7.9	29.9	16.2	5.5	21.7	5.8	2.4	8.2
6.	Himachal Pradesh	10.2	0.5	10.7	5.8	0.3	6.1	4.4	0.2	4.6
7.	Jammu & Kashmir	13.9	4.5	18.4	8.1	2.2	10.3	5.8	2.3	8.1
8.	Karnataka	131.9	41.6	173.5	102.9	34.7	137.7	29.0	6.9	35.9
9.	Kerala	94.1	23.0	117.1	55.9	15.6	71.5	38.2	7.4	45.6
10.	Madhya Pradesh	242.7	43.1	285.8	218.0	36.9	254.9	24.7	6.2	30.9
11.	Maharashtra	234.1	62.1	296.2	176.1	55.9	232.0	58.0	6.2	64.2
12.	Manipur	2.9	0.8	3.7	1.3	0.6	1.9	1.6	0.2	1.8
13.	Meghalaya	5.2	0.6	5.8	3.9	0.1	4.0	1.3	0.5	1.8
14.	Orissa	151.6	11.1	162.7	107.7	10.4	118.1	43.9	−0.7	44.6
15.	Punjab	15.0	10.5	22.5	13.7	10.7	24.4	−1.3	−0.2	−2.1
16.	Rajasthan	82.7	20.8	103.5	105.0	21.2	125.2	−22.3	−0.4	−21.7
17.	Tamil Nadu	177.2	67.2	244.4	147.6	52.6	200.2	29.6	14.6	44.2
18.	Tripura	10.6	0.6	11.2	4.6	0.5	5.1	−6.0	−0.1	−6.1
19.	Uttar Pradesh	422.8	83.2	506.0	440.0	90.6	530.6	−17.2	−7.4	−24.6
20.	West Bengal	220.4	45.1	265.5	183.9	41.2	225.1	36.5	3.9	40.4
21.	Nagaland, Sikkim and all Union Territories	13.8	6.2	20.0	17.9	14.4	32.3	−4.1	−8 2	−12.3
	All India	2531.0	537.0	3068.0	2215.0	405.0	2710.0	316.0	132.0	358.0

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THE NORTH-SOUTH RELATIONS AND* ECONOMIC DEVELOPMENT

Rikard Lang

The "north-south" relations, in the context of this paper relations between countries with different levels of economic development, pertain to the essence of the topic of this session and of the congress itself. The explanation of its historical roots and the problems which grow out of this relationship are directly in connection with the central economic issue of the optimal use of resources so as to maximize human welfare since it generates, by its very nature, a suboptimality in this sense as well as waste.

The economic relations between countries with different levels of economic development are key issues in the current world-wide discussion of the international division of labour and the cooperation in economic development; they are in the centre of the proposed changes in the institutional structure of the system of international economic relations and the restructuring of the world economy. These changes are the crux of the concept and the approaches to the establishment of a new international economic order. New patterns of specialisation and cooperation are envisaged in order to affect positively the pace and path of economic development of the developing countries. The emphasis is on the urgent need to restructure the world economy and the institutional framework of international economic relations; that is the economic and humane background of the new approaches to the "north-south" linkages.

The topic of this paper covers a wide field. Beeause of the restricted space allotted, it will be limited to some aspects of the developing countries approach to the "north-south" relationships.

The opinion is often voiced that economic problems have emerged as the most acute ones in international relations. Under the impact of economic, social, political and other forces, particularly economic relations between countries with different levels of economic development—the developed and the developing countries—became very important. The world-wide awareness is growing of the consequences of the content and nature of this relationship.

The broadly used term "north-south" for specific relationships among countries indicates not only the differences in the levels of economic development, but emphasizes especially the specific content and nature of

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these relations which create problems in the global functioning of the world economy and great difficulties to the developing countries. The "north-south" relationships are here viewed in the context of the very urgent needs of the developing countries, the great majority of the countries of the world inhabited by the bulk of mankind, to accelerate their economic development. The "north-south" relationships with their present content generate obstacles to achieve this aim. The solution of this problem is now approached and possibilities envisaged within a new international setting, which is in a high degree under the impact of the changes which occurred in the process of decolonisation, affecting the responsibilities and functions of the participants in these relationships. The importance of this issue is such that its impact and the consequences of the solutions applied are not limited to the present generation.

The discussion of the linkages of developed and developing countries, the ensuing dependencies, interactions and interdependencies which arise out of their specific nature do not involve only the "north-south" relationships, but also the "south-north", "north-north" and "south-south" ones, of course, closely connected with developments within countries. The "north-south" relationships deeply affect the functioning of the world economy and are not limited to the development problems of the developing countries.

The various aspects of the "north-south" relationships became relatively recently a field of economic research; they are regularly recurring items on the agendas of a growing number of national and international fora. Research and intergovernmental negotiations are in a high degree concentrated on solutions of the difficulties regarding economic development of the developing countries which create the present international economic relations. Many arguments are advanced proving that the very pronounced asymmetry in the levels of economic development and the growth potentials, which differentiate the countries of the "north" from those of the "south", cannot be reduced in a satisfactory manner within the framework of the existing system of international economic relations. The developing countries bear the brunt of the very persistent crisis of development. The present systems of international economic relations are barriers to the economic development which is of vital importance to the developing countries. Global alternatives are proposed to this system, created largely by the industrialized countries for the promotion of their interests. The respective proposals are the outcome of experiences broadly shared by the developing countries and of research, deliberations as well as discussions and negotiations during the post-World War II period.

The proposals regarding the solution of the problems created by the north-south relationships have been prompted after the World War II; their intensity increased and the center of the discussions shifted under

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the impact of experience and deeper insights. The efforts directed towards changes entered in the mid-70s into an important new phase. On the initiative of the developing countries proposals are advanced, and broadly backed, for global solutions of the fundamental causes generated by the "north-south" relations. These proposals are not limited to the symptoms of these relationships, they surpass peripheral changes or only marginal adjustments within the limits of the present international economic relations. Structural changes became basic issues.

The prominence which got the endeavours to indicate the necessary content of international economic relations, particularly the "north-south" ones, which will promote the economic development of the developing countries and devise avenues to changes through a global development strategy are a new phenomenon. It is reflected in economic theory, its explanatory and decision-making value. The accumulated experience, positive and negative, with sustained development efforts and the advances in the field of theory indicate areas of crucial importance directly connected with the "north-south" relationships.

The "north-south" relationship is in close interaction with the very tenacious difference between the levels of economic development of countries as constituent elements of the system of international economic relations. The structural features of the world economy are of basic importance for an understanding of the present difficulties of its functioning and the devising of solutions of the problems which burden it. The "north-south" relationships are symptoms of structural deficiencies of the world economy and they have a high explanatory value for the differences between the development trends and the development potential of countries on different levels of economic development. The solution of structural problems can therefore not be bypassed when discussing the "north-south" relationship and its negative impact on the pace and path of economic development of the developing countries.

In spite of the fact that GNP is for various reasons a "primitive concept" the differences in the level of GNP per capita are very important indicators, although not the only ones, of the very persistent polarization in the world economy denoting a scale of economic power of different countries and therefore of positions in international economic relations. The position of a particular country is determined by its relative economic and political power, primarily as a consequence of its level of economic development. The existing differences in this regard affect very deeply the international economic relations. Although being of basic importance, there are besides them also other factors which have an impact on "north-south" relations (e.g. the resource endowment, the socio-economic system).

The deep differences between the levels of economic development of

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countries are often measured and analysed. According to the World Bank Atlas (I, p. 8) on the one pole are countries with an average GNP per capita, at market prices, of US$ 120, whereas on the other pole are those countries with an average GNP per capita of US$ 5970. The significance of this polarization shows the fact that out of a total population of 3836 millions, covered by this analysis, 1151 millions have an average per capita GNP of US$ 120, another 1184 millions such a GNP of US$ 280. On the other pole, the group of countries belonging to the group with an average per capita GNP of 5970 dollars has a total population of 316 millions.

It is estimated (2, Table I) that the group of the least developed countries, with a total population of 239 millions, had in 1974 (1973 prices—dollars) an average per capita GNP below the average of the developing countries as a whole. Whereas the average GNP per capita of this group of countries amounted to US$ 104, this average for the developing countries as a whole was US$ 321.

The data for the mid-70s (3, Table I) prove that the differences of the levels of economic development between the rich and the poor countries basically did not change. The distance between the developed and the developing countries has not been reduced. Changes, pertaining to a small number of developing countries regarding their rank, according to weighted economic and social indicators, occurred only within the group "south".

According to different economic and social indicators the developing countries are not homogeneous, but they share among themselves especially structural characteristics which affect adversely their development potential. It is rightly emphasized that among the constraints of their development policy and their developmental efforts structural factors are of particular importance for their sustained economic development. The fact itself that the bulk of mankind lives in countries on a low level of economic development, resulting in hardships and great difficulties, is recognized as affecting fundamentally the international relations; it cannot be separated from the structure of the world economy. Changes in this structure are required for the reduction of the negative impact of the "north-south" relationship on the economic development of the developing countries.

The broadening of the spectrum of international economic relations, a consequence of the progressive internationalisation of production, increases the possibilities of polarization.

Economic power can be applied in different ways. Of special significance is the creation of a network of lasting links characterizing the developing countries' status of economic dependence on the developed ones, appearing as dependencies on the rates of growth in the developed countries, foreign trade dependencies, technological dependencies, financial

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dependencies and other unilateral links. An economically more powerful country becomes the nucleus of linkages with other less developed countries; the countries of the group "south" are in a status of dependence on the centre of such a process.

Under conditions of economic inequality a key issue becomes the manner in which economic power is applied as a combination of the economic potential and the economic strategy of the dominant country. These conditions permit—under different combinations of strategies (5)—the introduction of specific relations of dependence and dominance which are, in fact or potentially, the foundations of different types of exploitation of the developing by the developed countries, the centres of industrial growth.

The dominant country can decisively influence the formation of the structure of production of the dominated one in such a manner that it serves the aims of the economically more powerful country. Its socio-economic development is subordinated to the goals and criteria of the dominant one. Such a dominant country thus realizes its economic and other advantages. Mechanisms of domination in international economic relations serve this purpose.

A system of international economic relations directed towards the perpetuation of the dependent staus of the developing countries is thus established. The essence of the urgent demands of the developing countries to restructure the present international economic relations is in fact their request to reduce the fundations on which are built the "north-south" relations and to eliminate thus the barriers to their economic development.

Structural changes are in progress in the world economy but they are too slow in comparison with the intensity of the development needs of the developing countries and, besides that, they are limited only to a small number of these countries inhabited by not more than a fraction of the total population of the countries belonging to the "south".

The rate of economic growth during the past 15 years did on the whole not narrow the gap separating the "north" from the "south". The majority of the developing countries with the bulk of the population belonging to this set had a low recorded rate of economic growth. The UN World Economic Survey 1975 (6, p. 87) presents data on the distribution of the developing countries according to rates of economic growth during the period 1970–1975. Only 14 of 105 countries with a population of 215 millions (12 per cent of the 1805 millions of the population of the developing countries included) had an average annual per capita increase in production (gross domestic product—1970 dollars) of 9 and more per cent. Developing countries with a total population of 805 millions experienced such a rate of growth of less then 3 per cent during the same time.

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The levels and rates of economic growth explain the estimated outstanding differences in the annual average increments in real product per head in the period 1960–1975 of countries on different levels of economic development (4, p. 8). The projections (3, Table I) till 1980 of the per capita growth of GNP for the developing countries—based on three assumptions: (a) a continuation of the growth rate of the per capita real product achieved during the period 1960–1970, (b) a continuation of this growth rate in the period 1970–1975, (c) a growth rate of 3.5 per cent of the per capita gross product—do not anticipate a narrowing of the gap between the "north" and the "south". One can expect that such tendencies could lead to increased tensions within the present setting of international relations.

It is not surprising that it is so often stressed that economic development is of primary importance for the majority of mankind; it ranks as a policy goal of the highest priority. A higher rate of economic growth is a necessary condition for the solution of the huge and very urgent human, social, economic, political difficulties of the developing countries; it is a question of survival for vast numbers of people.

The structure of production of the developing countries explains their low level of economic development. This structure is related to the "north-south" relationships, their historical roots in the colonial era and the economic, political and social structures of this period.

Gradually deepened and broadened the insights into the causes, interactions and consequences of the "north-south" relationships, especially after World War II. The attitudes of the developing countries became more articulate to this relationship in the process of decolonisation. The present "north-south" relationship evolved over a prolonged period of time, but the requests for their change became more insistent during the last decades and especially in the 70s under the altered political and economic environment.

The inadequacies of the institutional structure of international economic relations and the deficiencies of the structure of the world economy, deeply rooted in the nature of the "north-south" relationship, became more evident after World War II under the impact of several factors. One of the most important events following the end of the war, affecting international relations, was the achievement of political independence of a significant number of countries which have previously, under colonial rule or quasi-colonial dependence, not been in a position to decide independently on their development strategies. They assert this right in the changed environment. The breakdown of the post-war monetary system, the failures of the world market, the difficulties arising out of the developing countries' exports of primary products, the absence of coun-

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tervailing powers to the emergence of new power relations continuing the states of economic dependence of the developing countries in general, the increasing role of transnational companies and other aspects of the present crisis conditions of the world economy, affecting negatively the economic development of the developing countries, contributed to the widening of the gap separating the countries of the "south" from those of the "north".

The fact that the rate of economic growth of the developing countries is falling behind those required to achieve a higher level of economic development appropriate to satisfy even the basic needs of their populations gives a specific importance to this phenomenon. It is a characteristic feature of the international situation that the developing countries do not confront any more passively the "north-south" relationship and its consequences. They insist that fundamental changes in these relations ought to assume the highest priority and stress that it is not possible to resolve the problems generated by them without fundamental changes in the existing international division of labour which is a main feature of the "noth-south" relationship.

The developing countries maintain in their approach to the "north-south" relationship that the urgent need to change the present freamework of international economic relations is not merely a consequence of the increasing evidence of the inadequacy of the existing relationship among countries with different levels of economic development. A more fundamental argument is raised: the present structure of international economic relations did not comply with the development needs of the countries of the "south" even when it worked satisfactorily according to the criteria of its architects, nor have been successful, in this sense, the hitherto international development policies. Requests for changes are therefore not directed merely towards improvements of the functioning of the existing system, they are not limited to adjustments of the present structure of international economic relations.

This system is a constraint to the developmental efforts of the developing countries. It is a consequence of the nature of the "north-south" relationship that the development of the countries on a lower level of economic development is not shaped autonomously. Economic independence requires a reversal of the sequence of development policies; under such conditions international economic relations are a function of the developing countries' development strategies and not vice versa. The solution of the problems which are generated by the "north-south" relationship requires changes of the fundations on which these relations are built. It is substantiated that the problems of the "north-south" relationships can be solved only within a new structure of international economic relations. Projections regarding the future trends under the impact of the

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"north-south" relations, on the assumption of a continuation of the present ones, prove that the difficulties of the developing countries will increase. Such a trend would have not only a negative impact on the development aims of the developing countries, but would also adversely affect the long term interests of developed countries.

It cannot be expected that the reorganization of the persent unbalanced and inequitable "north-south" relationship could conform in a spontaneous manner to the development requirements and priorities of the developing countries under the impact of the forces and mechanisms which govern trade and other economic relations between countries with different levels of economic development. On the other hand, a better understanding of the sources of underdevelopment contributes to the identification of actionable variables of a policy of economic development within an appropriate national as well as international setting.

The development problems of the countries belonging to the group denoted as "south" became regular items of numerous and important international meetings; they are no more neglected as areas of economic research. Different approaches, opinions and concepts, expressions of specific interests, can be met in this connection on the development perspectives, the causal relations of underdevelopment and the elements of national and international development policies.

The concepts which support the present system of international economic relations, including the "north-south" relationship, assume that the free circulation of goods, services, capital, knowledge through market forces are automatically conducive to a rational allocation of resources, a more equitable distribution of wealth and a more efficient structure of production.

However, it is emphasized that a number of factors, national and international, caused a failure of this mechanism; the assumptions of neoclassical theory are not confirmed. The forces influencing the market criteria distort this mechanism and render it imperfect. Prices in international trade are under the impact of protection and discrimination, money is turned into a manipulative and transfer mechanism of the developed countries, inflation is mostly transferred from countries on a higher level of economic development to those on a lower level. Besides these, other factors too impair the market mechanism and affect adversely its efficiency. Thus, the market mechanism, under present conditions, contributes to the polarization of countries with different levels of economic development.

The control of strategic resources, capital markets, patents and licences is more conducive to a trade pattern based on and continuing unilateral economic dependencies on the countries of the "north" than to rational and efficient interdependencies in the world economy. The possibilities at

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the disposal of developed countries—of economies of scale, the introduction and diffusion of technical progress, monopolistic advantages and other factors—contribute under the impact of the market mechanism, with its present characteristics, to differences in the rate and level of economic development, to inequalities in development opportunities between the countries of the "north" and those belonging to the group "south". As a consequence of such tendencies, the developing countries in general experience growing difficulties in overcoming the economic, financial, technological, research, organisational and other thresholds of economic development. The institutional structure of international economic relations does not work automatically towards and elimination of the factors of economic polarization.

Under such conditions, technical progress too turned into an important factor of the redistribution of wealth in favour of the developed countries. The impact of this factor is enhanced as a consequence of its connection with the process of monopolisation an the activities of transnational companies.

The political independence acquired by many developing countries after World War II gave to them a strong impulse to investigate the factors and the negative impact of the "north-south" economic polarisation and to investigate alternatives to the present system of international economic relations. The demands of the developing countries are directed towards a more efficient organisation of the international economic relations in the interest of world economic expansion, feasible in the long run only under conditions of a greater equality in development opportunities conducive to a more equal distribution of the incremental value.

The present crisis of development, the experience gathered with the prevailing system of international economic relations and the perspectives it opens to the developing countries as well as the failure of international development policies to create possibilities for a sustained rate of economic growth of the developing countries, provided the impetus to the countries, pertaining to the group "south", to conceive and present in the mid-70s proposals for an approach to the development problem through an alternative system of international economic relations based on "equity, sovereign equality, interdependence, common interest and cooperation" (7) denoted as the new international economic order. The coordinated endeavours of the developing countries, their concerted actions, are by itself an important new phenomenon.

The developing countries assert their sovereignty over their natural resources and development strategies, and demand persistently for a greater participation in the growing world production and distribution of goods and services. This is the foundation of the developing countries' new approach to the "north-south" problem in order to achieve a new

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international economic order. The solution of the problems arising out of the present "north-south" relations depends on structural changes of the world economy, particularly of the structure of world production. Only increased trade or aid within the present structure of international economic relations are not conducive to the expected changes.

The envisaged institutional structure of international economic relations includes the major areas of economic relations between countries. Changes in the structure of international trade constitutes one of its eminent elements. They comprise improvements of the terms of trade of the developing countries, the insurance of fair and remunerative prices in real terms to primary export earnings, price indexation, the conclusion and implementation of an integrated programme regarding international trade in commodities.

A condition of a successful developmental effort is an appropriate share of world trade for the developing countries. The present unsatisfactory situation in this regard requires an expansion of processing, diversification and a better access to the markets of the developed countries, a full participation in the transport, marketing and distribution of their products. The development needs of the developing countries demand for a general expansion of trade in the common interest among all countries—with different levels of economic development and different socio-economic systems.

An important element of the new institutional structure of international economic relations are changes in the international monetary arrangements. The new system refers to the areas of reserve creation, adjustment mechanisms, the developing countries' participation in decision making. The necessity of a proper link between the creation of liquidity and development finance is stressed.

Changes in the common interest demand an adequate transfer of resources from the developed to the developing countries. Experience has proved the importance of criteria of independence of the recipient country in connection with such a transfer. The heavy burden of the developing countries' debts is becoming a very serious obstacle to their economic development and requires urgent measures of alleviation.

A characteristic feature of the new approach to the "north-south" relationship is the integration of different aspects of economic development. Economic development is a global process; the separation of development issues did not bear fruitful results. The emphasis only on trade or aid relations did not solve the problems of the "north-south" relationship. The underlining of the need of changes in the area of production is an important characteristic of the approach to the "north-south" relationship within the new international economic order. Particular emphasis is on the need of industrialisation of the developing countries and the inter-

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dependence and interaction with other aspects of economic development.

A global strategy promoting economic development is an essential element of the developing countries' approach to the solution of the "north-south" problem. Its three-pronged character is a basic feature of such a successful strategy. There exists an interaction between internal development strategies of the developing countries, the strategies promoting economic development in the "north-south" relations and the development strategies in the relations among developing countries. Such a three-pronged global strategy is a condition of an effective comprehensive global development strategy. Within such a strategy, besides its other elements, is emphasized the need of the developing countries to industrialize, and, closely connected with the ensuing changes in the structure of production, is also the establishment of comprehensive economic relations among the developing countries.

The imbalance in world industrial production and consumption is outstanding; it is an essential form of the asymmetry in the world economy and characterizes the "north-south" relationship. The share of the developing countries in world industrial production is extremely low and did not change significantly for this group as a whole during the past two decades. There are no relevant indications, on the assumption of a continuation of present trends, that basic changes can be expected within an acceptable time-frame. Under such conditions, an acceleration of economic and social development of the developing countries would have no better chance than in the past. Industrialisation—with a pattern answering the specific needs of the developing countries—introduces new elements into the structure of production; it is of crucial importance for long-term economic development. Experience has amply proved that industrialization is a dynamic force affecting decisively the developing countries' economic and social progress; it is a necessary element of the optimal course to be followed by the countries belonging to the "south".

Alternative development strategies can be envisaged for the developing countries, but their common feature is that they are based on industrialization as a key element. An increased share in world industrial production is therefore prominent in the global development strategy. The respective well known target for the developing countries, contained in the UNIDO Lima Declaration and Plan of action, is to achieve 25 per cent of the world industrial production by the end of this millenium. Even after the attainment of this target, the per capita manufacturing output in the developing countries would be very low in comparison with this existing relation in the developed countries.

This target cannot be reached without a very significant acceleration of the overall rate of growth in the developing countries based on a con-

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certed action of countries on different levels of economic development and, of course, primarily a great developmental effort on the part of the developing countries. Industrial production is not isolated and numerous are the prerequisites for industrialisation. This deep structural change cannot be successful without an acceleration of the rates of growth and structural changes also in other sectors of the economy, in particular in agriculture, the services, and, dependent on the resource endowment of a country, in mining and forestry. These are not the only conditions for a successful industrialisation.

A significant increase in the developing countries' share of world industrial production requires a very important investment effort of the developing countries. Such a change has an impact on domestic consumption, the share of investment goods in the structure of production, the resource requirements. These requirements of a country in the process of industrialization in capital equipment and intermediate inputs can be satisfied through an expansion and diversification of the foreign trade of the developing countries which differs considerably from the present one. Their imports as well as their exports are involved as the developing countries will need markets also for their increased manufacturing output. An accelerated industrialization of the developing countries and their technological development need support of the international community, in particular the introduction of adequate industrial and trade policies in the developed countries. Thus, the industrialization of the developing countries depends on a changed international division of labour. A dynamic international division of labour especially in the field of industrial production is a means and a consequence of international economic relations promoting economic development of the developing countries.

The trade patterns among the developed and the developing countries reflect the structures of their economies and especially the function of industry in overall production. The structure of imports and exports undergoes changes in the process of industrialization. The sectoral export and import propensities will not remain the same in a number of branches. These are aspects of changes in a dynamic international division of labour conducive to the furtherance of economic development of the developing countries.

In the process of starting and for acceleration of their industrialization the developing countries will become very dynamic markets for the exports of manufactures from the developed countries. Such a tendency will have a positive impact on world trade in the common interest. Until now the intra-trade of the developed countries in manufactures increased considerably faster than their exports to the developing countries. The present volume, as well as the structure and economic organization of the "north-south" trade does not permit a degree of specialisation required for an

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acceleration of economic development of the countries of the group "south". A diversification and an expansion of the volume of exports from the developing countries is a prerequisite to changes of the "north-south" relationship. An argument against changes in the international division of labour is that imports of manufactures from the developing countries are more damaging to the economies of the developed countries than such imports from countries on the same level of economic development. Because of the space allotted, I shall limit myself only to some observations in connection with this argument.

The bulk of world trade in manufactures is now among the industrialized countries. A number of analyses stress the fact that specialisation of the developed countries is increasingly of the intra-branch type, whereas trade with the developing countries is characterized by inter-branch specialization. Because of the differences in the types of specialisation, a feature of the "north-south" relationship, there appear much greater possibilities for compensatory trade flows in the "north-north" relations than in the "north-south" ones. The argument against a dynamic international division of labour can therefore be reversed. As a consequence of a higher level of industrial development of the developing countries, accompanied by structural changes of their economies, their markets will expand and offer new possibilities also for the exports from the developed countries. There exist numerous possibilities to multiply the channels through which "north-south" trade can expand and diversify; thus it can bring the "north-south" trade closer to its potential volume and composition.

According to foreign trade projections the exports of the developing countries, under the assumption of the implementation of the Lima target of growth of industrial production, will have to increase at such a rate that an expansion of the intra-trade among the developing countries will become an important aspect of the new international division of labour leading to a more efficient mobilization and allocation of resources promoting the economic development of the countries of the "south". The intra-trade in manufactures among the developing countries is now far below its potential.

A number of factors contributed in the 70s to the increased attention paid to the links between the developing countries for their economic development. This new trend has become a prominent feature of the developing countries' endeavours to reshape the international economic relations; its progress will positively reflect on the "north-south" relationship. The developing countries will be in a better position to increase and diversify their economic relations with the developed countries on a higher level of economic development. This move towards the establishment of a comprehensive programme of economic cooperation, based on self-reliance and collective self-reliance became an essential element of a global policy

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aimed towards the promotion of the economic development of the developing countries. It contributes to the reduction of their excessive economic dependence on the developed countries and increases their possibilities to participate in the international environment of their economic development.

Previously, the developing countries had practically no possibility to establish directly trade and other economic relations among themselves as their economies could be linked only through metropolitan countries. A consequence of such links is the very low percentage of trade among the developing countries in total trade. The long-term trade potential for mutual trading relationships is important as there exists a basis for their expansion. Because of differences in stages of economic development and a variety of resource endowments there exist new complementarities among the developing countries opening great opportunities for an expansion of economic cooperation among them. Economic cooperation between the developing countries is a means to utilize better their resources and thus activate their development potential.

The implementation of the comprehensive programme of economic cooperation among the developing countries requires concerted actions. Concrete actions are envisaged in key areas of international economic relations—raw materials, foreign trade in general, financial cooperation, industrialization, infrastructure, services, science, technology and other fields—directed towards closer economic cooperation among the developing countries.

The concept of this cooperation passed through a marked evolution particularly in two aspects. First, as the importance grew of this cooperation within the new global strategy of economic development of the developing countries, the emphasis shifted from trade towards joint endeavours in the field of production. Second, this concept has been previously mainly related to schemes of regional or subregional economic cooperation. However, it got a new dimension with the envisaged possibilities of an expansion of cooperation among the developing countries in general. The idea of collective self-reliance refers now to economic cooperation beyond territorial contiguity and relates to subregional, regional and interregional cooperation.

The aim of collective self-reliance is not autarchy of the developing countries but the mobilization and a more rational use and allocation of these resources in order to accelerate their economic development. The ensuing restructuring of the world economy is in the common long-term interest of the participants in the "north-south" relationship. It opens new areas for economic analysis and introduces new criteria for the relevance of economic theory.

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ANNOTATIONS

1. World Bank, *World Bank Atlas*, 1975.
2. Least developed among developing countries, developing insland countries and developing land-locked countries, UNCTAD IV, Nairobi, 1976, Document TD/191/Supp. 1.
3. Basic data on the least developed countries, UNCTAD, 1977, Document TD/B/AC. 21/3.
4. Review and appraisal of the implementation of the International Development Strategy, the Declaration and the Programme of Action on the Establishment of a New International Economic Order, The Charter of Economic Rights and Duties of States, and General Assembly resolution (S-VII) on development and international economic co-operation, UNCTAD Document TD/B/642, Geneva.
5. Ivo Fabinc analysed the "north-south" relationship in his recent book *Strategija medjunarodnih ekonomskih odnosa* (Strategy of international economic relations), BIGZ, Beograd, 1976.
6. United Nations, Department of Economic and Social Affairs, *World Economic Survey 1975*, New York, 1976.
7. Declaration and Programme of Action on the Establishment of a New International Economic Order.

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TABLE 1
BASIC INDICATORS—ASIAN COUNTRIES

S.N.	Countries	Population (millions) mid-1983	Area (thousands of square kilometres	GNP per capita		Average annual rate of inflation (per cent)		Life expectancy at birth (years) 1983
				Dollars 1983	Average annual growth rate (per cent) 1965–83	1965–73	1973–83	
	Low-income Economies							
1.	Bangladesh	95.5	144	130	0.5	7.3	9.6	50
2.	Nepal	15.7	141	160	0.1	5.8	8.1	46
3.	Burma	35.5	677	180	2.2	2.8	6.5	55
4.	India	733.2	3,288	260	1.5	6.3	7.7	55
5.	China	1019.1	9,561	300	4.4	−1.0	1.7	67
6.	Sri Lanka	15.4	66	330	2.9	5.1	14.5	69
7.	Pakistan	89.7	804	390	2.5	4.8	11.1	50
8.	Afghanistan	17.2	648	—	0.5	3.8	—	36
9.	Bhutan	1.2	47	—	—	—	—	—
10.	Viet Nam	58.5	330	—	—	—	—	—
	Middle-income Economies							
11.	Indonesia	155.7	1,919	560	5.0	63.0	18.0	54
12.	Philippines	52.1	300	760	2.9	8.8	11.7	64
13.	Thailand	49.2	514	820	4.3	2.5	8.7	63
14.	Korea, Dem. Rep.	19.2	121	—	—	—	—	65
15.	Mongolia	1.8	1565	—	—	—	—	65
	Upper Middle-income							
16.	Malaysia	14.9	330	1860	4.5	1.2	6.5	67
17.	Korea, Rep. of	40.0	98	2010	6.7	15.5	19.0	67
18.	Hong Kong	5.3	1	6000	6.2	6.4	9.9	76
19.	Singapore	2.5	1	6620	7.8	3.1	4.5	73
20.	Iran, Islamic Rep.	42.5	1648	—	—	5.5	—	60
21.	Iraq	14.7	435	—	—	3.2	—	59
	High-income Oil Exporters							
22.	Oman	1.1	300	6250	6.5	7.1	17.9	53
23.	Saudi Arabia	10.4	2150	12230	6.7	5.1	16.5	56
24.	Kuwait	1.7	18	17880	0.2	4.6	10.2	71
25.	United Arab Emirates	1.2	84	22870	—	—	12.7	71
	Industrial Market Economies							
26.	Japan	119.3	372	10,120	4.8	6.0	4.7	71

Source: World Development Report, 1985, p. 175.

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TABLE 2

GROWTH OF PRODUCTION—ASIAN COUNTRIES

S.N.	Countries	Average annual growth rate (per cent)									
		GDP		Agriculture		Industry		Manufacturing		Services	
		1965–73	1973–83	1965–73	1973–83	1965–73	1973–83	1965–73	1973–83	1965–73	1973–83
	Low-income-Economies										
1.	Bangladesh	—	5.2	0.4	3.2	−6.1	8.1	—	—	1.5	7.4
2.	Nepal	1.7	3.0	1.5	1.0	—	—	—	—	2.1	6.9
3.	Burma	2.9	6.0	2.8	6.6	3.6	7.7	3.2	6.1	2.8	5.1
4.	India	3.9	4.0	3.7	2.2	3.7	4.3	4.0	4.2	4.2	6.1
5.	China	7.4	6.0	1.9	3.5	9.1	8.4	—	—	—	4.5
6.	Sri Lanka	4.2	5.2	2.7	4.1	7.3	4.8	5.5	3.4	3.8	6.0
7.	Pakistan	5.4	5.6	4.7	3.4	6.6	7.2	6.2	7.0	5.4	6.3
8.	Afghanistan	1.0	2.4	−1.5	—	4.0	—	—	—	5.1	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
	Middle-income Economies										
11.	Indonesia	8.1	7.0	4.8	3.7	13.4	8.6	9.0	12.6	9.6	9.0
12.	Philippines	5.4	5.4	4.1	4.3	7.4	6.4	8.5	5.0	4.8	5.2
13.	Thailand	7.8	6.9	5.2	3.8	9.0	9.0	11.4	8.9	9.1	7.6
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—
	Upper Middle-income										

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Upper Middle-income										
16. Malaysia	6.7	7.3	—	4.4	—	8.7	—	—	—	8.2
17. Korea, Rep. of	10.0	7.3	2.9	1.5	18.4	11.2	21.1	11.8	11.3	6.9
18. Hong kong	7.9	9.3	−0.6	1.1	8.4	8.2	—	—	8.1	9.8
19. Singapore	13.0	8.2	5.7	1.5	17.6	8.5	19.5	7.9	11.5	8.1
20. Iran, Islamic Rep.	10.4	—	5.2	—	10.5	—	—	—	12.7	—
21. Iraq	4.4	—	1.7	—	4.8	—	—	—	5.1	—
High-income Oil Exporters										
22. Oman	21.9	6.5	—	—	—	—	—	—	—	—
23. Saudi Arabia	11.2	6.9	2.6	6.6	13.3	3.9	10.6	8.0	8.3	12.9
24. Kuwait	5.1	1.4	—	9.4	—	−4.3	—	—	—	7.8
25. United Arab Emirates	—	10.8	—	—	—	—	—	—	—	—
Industrial Market Economies										
26. Japan	9.8	4.3	2.1	−1.6†	13.5	5.5	—	—	8.3	3.8

Source: World Bank, *World Development Report 1985*, pp. 176–77.

† Figures are for 1973–82, not 1973–83.

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TABLE 3

STRUCTURE OF PRODUCTION—ASIAN COUNTRIES

S.N.	Countries	GDP (millions of dollars)		Distribution of gross domestic product (per cent)							
				Agriculture		Industry		Manufacturing*		Services	
		1965	1983	1965	1983	1965	1983	1965	1983	1965	1983
	Low-income Economies										
1.	Bangladesh	4,380	10,640	53	47	11	13	—	—	36	40
2.	Nepal	730	2,180‡	65	59	11	14‡	3	4‡	23	27
3.	Burma	1,600	6,190	35	48	13	13	9	9	52	39
4.	India	46,260	168,170	47	36	22	26	15	15	31	38
5.	China	65,360	274,630	40†	37	38†	45	—	—	22†	18
6.	Sri Lanka	1,770	4,770	28	27	21	26	17	14	51	47
7.	Pakistan	5,450	25,880	40	27	20	27	14	19	40	46
8.	Afghanistan	620	—	—	—	—	—	—	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
	Middle-income Economies										
11.	Indonesia	3,630	78,320	59	26	12	39	8	13	29	35
12.	Philippines	6,010	36,640	26	22	28	36	20	25	46	42
13.	Thailand	4,050	40,430	35	23	23	27	14	19	42	50
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—

Upper Middle-income

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Upper Middle-income										
16. Malaysia	3,000	29,280	30	21	24	35	10	19	45	44
17. Korea, Rep. of	3,000	76,640	38	14	25	39	18	27	37	47
18. Hong Kong	2,150	27,500	2	1	40	30	24	22	58	69
19. Singapore	970	16,640	3	1	24	37	15	24	73	62
20. Iran, Islamic Rep.	6,170	—	26	—	36	—	12	—	38	—
21. Iraq	2,430	—	18	—	46	—	8	—	36	—
High-income Oil Exporters										
22. Oman	60	7,460	61	—	23	—	—	—	16	—
23. Saudi Arabia	2,300	120,560	8	2	60	66	9	6	31	32
24. Kuwait	2,100	21,330	—	1	73	61	3	6	27	38
25. United Arab Emirates	—	27,520	—	1	—	65	—	10	—	34
Industrial Market Economies										
26. Japan	90,970	1,062,870‡	9	4‡	43	42‡	32	30‡	48	55‡

Source: World Bank, *World Development Report 1985*, pp. 178–79.

* Manufacturing in part of industrial sector but its share in GDP is shown separately because it is typically the most dynamic part of industrial sector.

† Figures are for 1966, not 1965.

‡ Figures are for 1982, not 1983.

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TABLE 4

STRUCTURE OF DEMAND—ASIAN COUNTRIES

S.N.	Countries	Distribution of gross domestic product (per cent)											
		Public consumption		Private consumption		Gross domestic investment		Gross domestic savings		Exports of goods and non factor services		Resource balance	
		1965	1983	1965	1983	1965	1983	1965	1983	1965	1983	1965	1983
	Low-income Economies												
1.	Bangladesh	9	8	83	91	11	17	8	2	10	8	−4	−15
2.	Nepal	†	†	100	91	6	20	—	9	8	10	−6	−11
3.	Burma	†	14	87	69	19	22	13	17	14	8	−6	−5
4.	India	10	11*	74	67*	18	25	16	22	4	6	−2	−3
5,	China	†	†	75	69	25	31	25	31	3	9	—	1
6.	Sri Lanka	13	8	74	78	12	29	13	14	38	26	1	−15
7.	Pakistan	11	11	76	82	21	17	13	7	8	13	−8	−11
8.	Afghanistan	†	—	99	—	11	—	1	—	11	—	−10	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—	—	—
	Lower Middle-income Economies												
11.	Indonesia	6	11	88	69	7	24	6	20	5	25	—	−4
12.	Philippines	9	8	70	71	21	27	21	21	17	20	—	−7
13.	Thailand	10	13	71	67	20	25	19	20	18	22	−1	−5
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—	—	—

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Upper Middle-income												
16. Malaysia	15	18	63	53	18	34	23	29	44	54	4	−5
17. Korea, Rep. of	9	11	83	62	15	27	8	26	9	37	−7	−1
18. Hong Kong	7	8	64	67	36	27	29	25	71	95	−7	−2
19. Singapore	10	11	80	47	22	45	10	42	123	176	−12	−3
20. Iran, Islamic Rep.	13	—	63	—	17	—	24	—	20	—	6	—
21. Iraq	20	—	50	—	16	—	31	—	38	—	15	—
High-income Oil Exporters												
22. Oman	—	†	—	54*	—	29*	—	46*	—	61*	—	18*
23. Saudi Arabia	18	27	34	33	14	31	48	40	60	54	34	8
24. Kuwait	13	19	26	51	16	23	60	29	68	56	45	7
25. United Arab Emirates	—	22	—	29	—	32	—	50	—	57	—	17
Industrial Market Economies												
26. Japan	8	10	58	59	32	28	33	30	11	14	1	2

Source: World Bank, *World Development Report 1985*, pp. 182–83.

*Figures are for 1982, not 1983.

†Public consumption figures are not available separately; they are therefore included in private consumption.

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TABLE 5
AGRICULTURE AND FOOD—ASIAN COUNTRIES

S.N.	Countries	Value added in agriculture (millions of 1980 dollars)		Cereal imports (thousands of metric tons)		Food aid in cereals (thousands of metric tons)		Fertiliser consumption (hundreds of grams of plant nutrient per hectare of arable land)		Average index of food production per capita (1974–76=100)
		1970	1983	1974	1983	1974–75	1982–83	1970	1982	1981–83
Low-income Economies										
1.	Bangladesh	5,427	6,545	1,719	1,844	2,130	1,252	142	512	101
2.	Nepal	1,102	1,255	19	72	0	44	30	138	91
3.	Burma	1,705	3,256	26	7	14	10	34	167	121
4.	India	45,793	58,981	5,261	4,280	1,582	282	114	346	108
5.	China	73,170	116,986	9,176	19,167	—	45	418	1,575	119
6.	Sri Lanka	812	1,199	951	775	271	369	496	713	127
7.	Pakistan	5,005	7,061	1,274	396	619	369	168	616	105
8.	Afghanistan	—	—	5	156	10	66	24	56	105
9.	Bhutan	—	—	23	13	0	3	—	10	104
10.	Viet Nam	—	—	1,854	239	6	27	512	506	111
Lower Middle-income Economies										
11.	Indonesia	12,097	20,225	1,919	2,992	301	155	119	750	121
12.	Philpipines	5,115	8,609	817	1,343	89	49	214	288	113
13.	Thailand	5,613	9,444	97	225	0	9	76	183	112
14.	Korea, Dem. Rep.	—	—	1,108	350	—	—	1,484	3,382	111
15.	Mongolia	—	—	2	—	—	—	—	—	—

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Upper Middle-income									
16. Malaysia	3,511	6,401	1,017	1,785	1	0	436	1,021	113
17. Korea, Rep. of	8,176	12,250	2,679	6,354	234	53	2,466	2,817	109
18. Hong Kong	321	244	657	907	—	—	—	—	101
19. Singapore	118	143	682	1,455	—	—	2,667	7,833	107
20. Iran, Islamic Rep.	—	—	2,076	4,456	—	0	76	656	103
21. Iraq	—	—	870	3,512	1	—	35	145	110
High-income Oil Exporters									
22. Oman	—	—	52	173	—	—	—	272	—
23. Saudi Arabia	833	1,713	482	3,482	—	—	44	832	34
24. Kuwait	42	108	101	459	—	—	—	7,320	—
25. United Arab Emirates	—	—	132	328	—	—	—	3,324	—
Industrial Market Economies									
26. Japan	38,299	39,554*	19,557	25,296	—	—	3,849	4,121	91

Source: World Bank, *World Development Report 1985*, pp. 184–185.

*Figures are for 1982, not 1983.

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TABLE 6

GROWTH OF CONSUMPTION AND INVESTMENT—ASIAN COUNTRIES

S.N.	Countries	Average annnal growth rate (Per cent)					
		Public consumption		Private consumption		Gross domestic investment	
		1965–73	1973–83	1965–73	1973–83	1965–73	1973–83
	Low-Income Economies						
1.	Bangladesh	*	*	0.9	5.4	−6.4	4.2
2.	Nepal	—	—	—	—	—	—
3.	Burma	*	*	2.9	5.4	2.5	14.1
4.	India	6.8	8.8	3.3	3.3	3.9	4.2
5.	China	*	*	3.7	5.5	8.9	6.6
6.	Sri Lanka	2.3	1.6	3.5	4.3	7.9	15.7
7.	Pakistan	6.2	4.7	5.9	6.1	0.4	4.9
8.	Afghanistan	*	—	1.1	—	−2.2	—
9.	Bhutan	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—
	Middle-income Economies						
11.	Indonesia	9.8	11.4	7.1	9.3	17.5	12.3
12.	Philippines	8.4	3.7	4.0	4.6	4.4	7.3
13.	Thailand	9.8	9.4	6.9	5.9	7.6	6.2
14.	Korea, Dem. Rep.	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—
	Upper Middle-income						
16.	Malaysia	6.9	10.2	4.6	7.2	9.1	11.9
17.	Korea, Rep. of	7.3	5.8	8.7	6.0	19.7	9.1
18.	Hong Kong	6.9	9.4	9.5	10.2	3.7	10.8
19.	Singapore	16.3	6.4	9.9	6.1	22.7	9.2
20.	Iran, Islamic Rep.	17.3	—	7.9	—	11.2	—
21.	Iraq	*	—	3.3	—	7.2	—
	High-income Oil Exporters						
22.	Oman	*	—	—	—	—	—
23.	Saudi Arabia	*	*	8.8	21.2	9.4	27.1
24.	Kuwait	*	—	4.3	—	—	—
25.	United Arab Emirates	—	—	—	—	—	—
	Industrial Market Economies						
26.	Japan	5.3	4.1	8.4	3.2	14.1	3.1

Source: World Bank, *World Development Report 1985*, pp. 180–181.

*Public consumption figures are not available separately; they are therefore included in private consumption.

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TABLE 7

INDUSTRY—ASIAN COUNTRIES

S.N.	Countries	Distribution of manufacturing value added (Per cent, 1975 prices)					Value added in manufacturing (millions of 1975 dollars)	
		Food and agriculture	Textiles and clothing	Machinery and transport equipment	Chemicals	Other manu-turing		
		1982	1982	1982	1982	1982	1970	1982
	Low-income Economies							
1.	Bangladesh	30	37*	4*	17*	12*	647	1,294
2.	Nepal	—	—	—	—	—	—	—
3.	Burma	31*	14*	1*	4*	50	287	486
4.	India	15	16	20	14	35	10,232	16,210
5.	China	—	—	—	—	—	—	—
6.	Sri Lanka	45*	13*	—	—	42*	556	748
7.	Pakistan	46*	14*	7*	16*	17*	1,492	2,967
8.	Afghanistan	—	—	—	—	—	—	—
9.	Bhutan	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—
	Lower Middle-income Economies							
11.	Indonesia	29	7	7	12	45	1,517	6,072
12.	Philippines	39	13	9	9	30	2,659	5,510
13.	Thailand	—	—	—	—	—	1,675	4,837
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—
15.	Mongolia	21	29	—	5	45	—	—
	Upper Middle-income							
16.	Malaysia	20	7	22	5	46	1,022	3,287
17.	Korea, Rep. of	15	22	20	11	32	2,368	11,492
18.	Hong Kong	—	—	—	—	—	1,914	3,679
19.	Singapore	5	3	53	5	34	827	2,431
20.	Iran, Islamic Rep.	14*	21*	10*	5*	50*	2,601	—
21.	Iraq	—	—	—	—	—	522	—
	High-income Oil Exporters							
22.	Oman	—	—	—	—	—	—	—
23.	Saudi Arabia	4	—	—	—	96	1,726	3,817
24.	Kuwait	—	—	—	—	—	368	894
25.	United Arab Emirates	—	—	—	—	—	—	—
	Industrial Market Economies							
26.	Japan	7	5	39	8	41	118,403	252,581

Source: World Bank: *World Development Report 1985*, pp. 186–187.

* Figures are for 1981, not 1982.

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TABLE 8

COMMERCIAL ENERGY—ASIAN COUNTRIES

S.N.	Countries	Average annual energy growth rate (per cent)				Energy consumption per capita (kilograms of oil equivalent)		Energy imports as a percentage of merchandise exports	
		Energy production		Energy consumption					
		1965–73	1973–83	1965–73	1973–83	1965	1983	1965	1983
Low-income Economies									
1.	Bangladesh	—	12.6	—	7.4	—	36	—	20
2.	Nepal	27.2	7.3	8.8	7.3	6	13	—	—
3.	Burma	9.6	7.2	5.9	5.7	39	65	4	—
4.	India	3.7	7.7	5.1	6.6	100	182	8	—
5.	China	11.8	5.7	11.9	5.4	170	455	—	—
6.	Sri Lanka	12.0	6.0	5.3	3.4	107	143	6	40
7.	Pakistan	5.8	8.6	1.7	7.8	136	197	7	49
8.	Afghanistan	46.5	−0.3	5.5	2.4	30	46	8	—
9.	Bhutan	—	—	—	—	106	—	—	—
10.	Viet Nam	−3.4	5.6	6.7	−2.1	—	90	—	—
Lower Middle-income Economies									
11.	Indonesia	12.7	2.7	6.4	7.8	91	204	3	20
12.	Philippines	4.6	20.8	9.1	2.3	160	252	12	44
13.	Thailand	10.5	13.7	14.6	5.4	80	269	11	39
14.	Korea, Dem. Rep.	9.3	3.1	9.5	3.6	504	2,093	—	—
15.	Mongolia	11.2	8.5	9.1	9.0	471	1,137	—	—

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Upper Middle-income									
16.	Malaysia	60.8	15.9	8.5	7.1	312	702	10	16†
17.	Korea, Rep. of	2.6	4.6	15.8	8.8	237	1,168	18	28
18.	Hong Kong	—	—	11.0	5.8	599	1,647	4	7
19.	Singapore	—	—	11.4	4.9	2,002	4,757	17	40
20.	Iran, Islamic Rep.	16.3	−12.9	13.3	1.0	537	976	—	—
21.	Iraq	4.5	−7.0	6.2	8.3	399	763	—	—
High-income Oil Exporters									
22.	Oman	57.2*	0.9	89.7	−4.1	—	764	—	1†
23.	Saudi Arabia	15.7	−1.2	12.4	6.8	1,759	3,536	—	—
24.	Kuwait	4.3	−9.8	0.5	0.4	—	5,443	—	—
25.	United Arab Emirates	24.1	−1.7	65.3	25.4	108	7,554	—	40
Industrial Market Economies									
26.	Japan	−3.1	5.0	11.9	0.4	1,496	2,929	19	—

Source: World Bank, *World Development Report 1985*, pp. 188–189.

*Figures are for 1966–73, not 1965–73.
†Figures are for 1981 or 1982, not 1983.

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TABLE 9

GROWTH OF MERCHANDISE TRADE—ASIAN COUNTRIES

S.N.	Countries	Mercantile trade (million dollars)		Average annual growth rate (Per cent)				Terms of trade (1980=100)	
		Exports	Imports	Exports		Imports			
		1983	1983	1966–73	1973–83	1965–73	1973–83	1981	1983
Low-income Economies									
1.	Bangladesh	789	1,502	−6.5	1.7	−8.2	4.1	102	102
2.	Nepal	94	464	—	—	—	—	—	—
3.	Burma	382	270	−4.8	4.9	−6.7	−0.6	111	84
4.	India	9,705	13,562	2.3	4.9	−5.7	2.8	91	96
5.	China	22,226	21,390	—	—	—	—	—	—
6.	Sri Lanka	1,066	1,788	−4.7	2.6	−3.2	4.7	95	104
7.	Pakistan	3,075	5,341	3.7	8.1	−2.9	5.7	99	101
8.	Afghanistan	391	798	5.9	6.8	−0.6	4.7	102	105
9.	Bhutan	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—
Lower Middle-income Economies									
11.	Indonesia	21,145	16,346	11.1	1.4	13.9	9.8	110	102
12.	Philippines	4,932	7,980	4.2	7.5	3.1	1.3	88	92
13.	Thailand	6,368	10,279	6.9	9.0	4.4	3.3	96	89
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—

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	Upper Middle-income								
16.	Malaysia	14,130	13,234	8.0	4.9	4.4	7.3	91	87
17.	Korea, Rep. of	24,445	26,192	31.7	14.8	22.4	7.5	93	100
18.	Hong Kong	21,951	24,009	11.7	10.3	10.5	12.0	97	—
19.	Singapore	21,833	28,158	11.0	—	9.8	—	—	—
21.	Iran, Islamic Rep.	16,445	11,539	12.4	−17.2	12.6	3.6	113	91
20.	Iraq	10,250	21.280	1.1	—8.5	4.6	21.2	125	110
	High-income Oil Exporters								
22.	Oman	4,058	2,492	—	—	—	—	—	—
23.	Saudi Arabia	79,125	40,473	15.0	−4.5	10.4	27.6	120	115
24.	Kuwait	10,447	8,283	5.5	−11.5	6.3	13.3	125	106
25.	United Arab Emirates	13,950	8,120	19.6	−2.1	8.5	14.3	117	105
	Industrial Economic Market Economies								
26.	Japan	146,804	125,017	14.7	7.4	14.9	1.3	103	106

Source: World Bank, *World Development Report 1985*, pp. 190–191.

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TABLE 10

STRUCTURE OF MERCHANDISE EXPORTS—ASIAN COUNTRIES

S.N.	Countries	Percentage share of merchandise exports									
		Fuels, minerals and metals		Other primary commodites		Textiles and cothing		Machinery and transport equipment		Other manufactures	
		1965	1982	1965	1982	1965	1982	1965	1982	1965	1982
Low-income Economies											
1.	Bangladesh	—	2	—	36	—	47	—	4	—	11
2.	Nepal	—	—	—	72	—	10	—	—	—	17
3.	Burma	5	—	94	—	—	—	—	—	—	—
4.	India	10	7	41	33	36	24	1	7	12	29
5.	China	—	26	—	20	—	15	—	6	—	34
6.	Sri Lanka	2	14	97	59	—	17	—	2	1	8
7.	Pakistan	2	6	62	34	29	46	1	2	6	12
8.	Afghanistan	—	—	87	—	13	—	0	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
Lower Middle-income Economies											
11.	Indonesia	43	85	53	11	—	1	3	1	1	2
12.	Philippines	11	12	84	38	1	7	—	3	5	39
13.	Thailand	11	7	84	64	—	10	—	6	4	13
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—
Upper Middle-income											
16.	Malaysia	35	35	59	42	—	3	2	15	4	5
17.	Korea, Rep. of	15	1	25	7	27	21	3	28	29	43
18.	Hong Kong	2	2	11	6	43	34	6	19	37	39
19.	Singapore	21	30	44	13	6	4	10	26	18	28
20.	Iran, Islamic Rep.	88	—	8	—	4	—	—	—	1	—
21.	Iraq	95	—	4	—	—	—	—	—	1	—
High-income Oil Exporters											
22.	Oman	—	92	—	1	—	—	—	6	—	1
23.	Saudi Arabia	98	99	—	—	—	—	1	1	1	—
24.	Kuwait	98	84	1	1	—	1	1	5	—	9
25.	United Arab Emirates	99	94	1	1	—	1	—	2	—	2
Industrial Market Economies											
26.	Japan	2	1	7	2	17	4	31	56	43	36

Source: World Bank, *World Development Report 1985*, pp. 192–193.

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TABLE 11

STRUCTURE OF MERCHANDISE IMPORTS—ASIAN COUNTRIES

S.N.	Countries	Percentage share of merchandise imports									
		Food		Fuels		Other primary commodities		Machinery and transport equipment		Other manufactures	
		1965	1982	1965	1982	1965	1982	1965	1982	1965	1982
Low-income Economies											
1.	Bangladesh	—	26	—	12	—	8	—	22	—	32
2.	Nepal	—	16	—	13	—	3	—	18	—	50
3.	Burma	15	—	4	—	5	—	18	—	58	—
4.	India	22	9	5	35	14	10	37	18	22	28
5.	China	—	23	—	1	—	18	—	17	—	41
6.	Sri Lanka	41	13	8	31	4	3	12	24	34	30
7.	Pakistan	20	14	3	31	5	7	38	23	34	26
8.	Afghanistan	17	—	4	—	1	—	8	—	69	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
Lower Middle-income Economies											
11.	Indonesia	6	7	3	21	2	5	39	38	50	29
12.	Philippines	20	10	10	26	7	4	33	22	30	38
13.	Thailand	7	5	9	31	5	7	31	24	49	33
14.	Korea, Dem. Rep	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—
Upper Middle-income											
16.	Malaysia	27	12	12	15	7	5	22	40	32	29
17.	Korea, Rep. of	15	12	7	30	26	15	13	23	38	20
18.	Hong Kong	26	14	3	8	11	5	13	22	46	52
19.	Singapore	24	8	13	34	18	4	14	28	30	26
20.	Iran, Islamic Rep.	16	—	—	—	6	—	36	—	42	—
21.	Iraq	24	—	—	—	7	—	25	—	44	—
High-income Oil Exporters											
22.	Oman	—	13	—	10	—	2	—	42	—	33
23.	Saudi Arabia	31	13	1	—	4	2	27	43	37	42
24.	Kuwait	26	15*	1	1*	2	2*	32	41*	39	42*
25.	United Arab Emirates	—	—	—	—	—	—	—	—	—	—
Industrial Market Economies											
26.	Japan	23	13	20	50	38	16	9	6	11	15

Source: World Bank, *World Development Report 1985*, pp. 194–195.

*Figures are for 1981, not 1982.

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TABLE 12

ORIGIN AND DESTINATION OF MANUFACTURED EXPORTS—ASIAN COUNTRIES

S.N.	Countries	Destination of manufactured exports (percentage of total)								Manufactured exports (millions of dollars)	
		Industrial market economies		East European non-market economies		High-income oil exporters		Developing economies			
		1965	1982	1965	1982	1965	1982	1965	1982	1965	1982
	Low-income Economies										
1.	Bangladesh	—	39	—	9	—	1	—	52	—	417
2.	Nepal	—	50	—	—	—	—	—	50	—	39
3.	Burma	73	—	1	—	—	—	26	—	1	—
4.	India	55	—	12	—	2	—	31	—	828	4,476
5.	China	—	—	—	—	—	—	—	—	—	12,225
6.	Sri Lanka	59	84	7	—	—	1	34	16	5	277
7.	Pakistan	40	49	1	6	3	17	57	28	190	1,417
8.	Afghanistan	—	—	—	—	—	—	—	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
	Lower Middle-income Economies										
11.	Indonesia	25	42	1	—	—	7	74	51	27	868
12.	Philippines	93	75	0	—	—	1	7	23	43	2,492
13.	Thailand	39	56	—	—	—	7	61	36	30	2,014
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—

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Upper Middle-Income										
16. Malaysia	17	67	—	—	2	2	81	31	75	2,781
17. Korea, Rep. of	68	62	0	0	—	11	32	27	104	19,237
18. Hong Kong	71	62	—	—	1	4	28	34	995	19,277
19. Singapore	9	49	—	1	3	6	88	44	338	11,834
20. Iran, Islamic Rep.	61	—	1	—	17	—	21	—	58	—
21. Iraq	24	—	1	—	16	—	60	—	8	—
High-income Oil Exporters										
22. Oman	—	11	—	0	—	70	—	18	—	303
23. Saudi Arabia	31	10	0	—	18	16	52	73	19	824
24. Kuwait	18	28*	—	—	33	21*	49	51*	17	2,453*
25. United Arab Emirates	—	13	—	—	—	55	—	32	—	777
Industrial Market Economies										
26. Japan	47	48	2	3	2	8	49	41	7,704	134,209

Source: World Bank, *World Development Report 1985*, pp. 198–99.

*Figures for 1981, not 1982.

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TABLE 13
ORIGIN AND DESTINATION OF MERCHANDISE EXPORTS—ASIAN COUNTRIES

S. No.	Countries	Destination of merchandise exports (percentage of total)							
		Industrial market economies		East European non-market economies		High-income oil exporters		Developing economies	
		1965	1983	1965	1983	1965	1983	1965	1983
Low-income Economies									
1.	Bangladesh	—	43	—	8	—	1	—	47
2.	Nepal	—	42	—	—	—	—	—	58
3.	Burma	29	34	8	3	1	2	62	61
4.	India	58	55	17	12	2	7	23	26
5.	China	47	42	12	5	2	2	40	52
6.	Sri Lanka	56	46	9	5	3	6	33	44
7.	Pakistan	48	35	3	4	4	22	45	39
8.	Afghanistan	47	33	27	55	0	1	25	10
9.	Bhutan	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—
Lower Middlde-income									
11.	Indonesia	72	73	5	1	—	1	23	26
12.	Philippines	95	77	0	2	—	1	5	20
13.	Thailand	44	56	1	2	2	5	53	37
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—
Upper Middle-income									
16.	Malaysia	56	50	7	3	—	1	36	47
17.	Korea, Rep. of	75	65	0	—	—	10	25	25
18.	Hong Kong	67	61	—	—	1	3	32	35
19.	Singapore	28	42	6	1	2	5	64	52
20.	Iran, Islamic Rep.	67	66	3	1	2	—	28	34
21.	Iraq	83	31	1	—	—	—	16	68
High-income Oil Exporters									
22.	Oman	—	69	—	—	—	—	—	31
23.	Saudi Arabia	71	66	0	—	8	5	21	30
24.	Kuwait	56	40	—	1	1	6	44	53
25.	United Arab Emirates	69	80	0	—	5	2	26	18
Industrial Market Economies									
26.	Japan	49	50	3	2	2	8	47	39

Source. World Bank, *World Development Report 1985*, pp. 196–197.

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ENVIRONMENTAL HAZARDS IN THIRD WORLD DEVELOPMENT

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Introduction

The concerns of most of the industrialized countries over the environmental issue in the late 1960s and the 1970s had been regarded with scepticism on the part of developing country decision-maker suspecting that first world preoccupation with environment might affect them adversely in the field of technology transfer, aid, growth and the like.[1] Global environmental interdependence has since become a commonplace in the understanding that the environmental aspects form an essential part of sustainable development effort. It is also understood, however, that developing countries are now in the focal point of international awareness of ecological destabilization.

Their inherent climatic vulnerability is aggravated by a series of demographic, cultural and economic risk factors which, in their interaction, arrest efficient action against environmental degradation. Conventional modernization models as well as traditional sector activities contribute substantially to aggravating the ecological imbalances of third world countries, least developed in particular.

It will be attempted here to outline the complexity and interplay of environmental hazards of developing countries with particular regard to pin-pointing the most crucial risk factors of environmental degradation and destabilization.

The study is organized in four chapters:

Chapter I sets the stage by reviewing the environment-development debate, the changes in perceptions and global economic realities.

Chapter II examines how the conventional modernization efforts in developing countries impact upon the ecological balance, what are the crucial environmental hazards in "modern sector" industrialization, farming and urbanization.

Chapter III surveys the extent, symptoms and causes of environmental destabilization that may be attributed to "traditional sector" activities in developing countries.

[1]United Nations Centre on Transnational Corporations, *Environmental Aspects of the Activities of Transnational Corporations: A Survey*, New York, 1985.

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Chapter IV summarizes the main risk factors that can lead to serious environmental degradation in a developing country and provides an outlook with regard to the evolution of this process.

I. Environment and Development—A Historical Overview

1. *Environment versus Development*

When the enviromental problems facing mankind started to be identified and more deeply understood at the beginning of the seventies[2] and when attempts to rank them according to their probable impact on the destinies of mankind were done for the first time, the almost universal consensus prevailed that such problems need to be linked with one main cause only, namely with what came to be called "modern economic growth".[3] The growth in the volume of output of goods and services, even if according to some opinions it "might well be considered worthless or even harmful,"[4] involving, as Kuznets stressed, "items that represent what many citizens condemn as a misuse of energy"[5] was held as the main culprit responsible for all the inadequacies which have beset the increasingly polluted, even if industrially developed part of the "blue planet".

To be more exact, it was not economic growth as such what was heavily criticized as having deteriorated the human environment, but the main engines responsible for its rapid movement particularly in the post-war years: industrialization coupled with consumerism.

The industrial revolution rooted in modern science and the consumer revolution stemming from an orientation of the broad masses towards what this world is able to offer them were originally of course expected to improve life until it was detected that they produced unwelcome side-effects which could make many of the positive contributions of economic growth problematic. The down-grading of the quality of environment

[2]"During the 1970s anxiety about the environment not only deepened but changed in quality and emphasis. . . . There is a growing tendency to make correlations between the quality of the environment and the quality of human life. Ecological, economic, and social decline are more often discussed as though they are interrelated. Environmental problems now engage a greater mix of disciplines and professions than a decade ago and in each group of specialists there is a new awareness of other disciplinary orientations to similar problems and . . . a new readiness to enter into genuine dialogue across disciplinary and professional boundaries." Brian Spooner, *Ecology in Development: A Rationale for Three-Dimensional Policy*, Tokyo, the United Nations University, 1984.

[3]Term proposed by Simon Kuznets in his *Economic Growth of Nations* (Cambridge, Mass., 1971).

[4]Simon Kuznets, *National Income and Its Composition, 1919–1941*, New York, 1941, p. 19.

[5]*Ibid.*, pp. 19–20.

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was then seen as a prelude to a decline of a broader phenomenon, namely that of the quality of life.

This verdict about modern economic growth and its main driving forces, implying a criticism of all material progress achieved by the industrially developed countries of the globe, which was claimed to be increasingly in conflict with Nature, seemed to be confirmed by all available evidence at the time when the first United Nations Conference on Human Environment was convened in Stockholm in 1972. Almost nobody dared to deny that the deterioration of the environment was caused by Man himself, that it was therefore in principle anthropogenous.

Man has created modern technology to serve his aims and to increase productivity in particular, yet precisely this technology which was an offspring of advanced science, so the reasoning went on, turned itself against its parent. If there was anything consolating in this gloomy picture, it was the conviction that those who were lagging behind in the international competition to seize the fruits of advanced science had no reason to be sorry. The environmental issues of the early seventies seemed to support a radical reappraisal of the development goals and processes as well as a reappraisal of who really gains in the international contest for more rapid economic growth.[6]

If such were the converging opinions concerning the concealed causes of environmental crisis at the time of the Stockholm Conference of the Human Environment, there is small wonder that the poorer countries started to be dissuaded by the rich from too bold ventures along the industrialization paths. Radical remedies on the contrary started to be sought how to persuade the affluent countries that they would do well if they decided to adjust to the allegedly inescapable necessity to come to terms with the life-style of a stationary state, predicted by some economists as early as the middle of the past century (J. St. Mill).

2. *The Globalization of the Ecological Problem*

As time passed by, however, and as more evidence and experience were accumulated during the seventies, together with the emergence of novel environmental problems which were not prominent at the time when the Stockholm Conference met, the opinions about the deeper causes of the environmental problems as well as about the most ecologically problem-ridden areas of the world began to diversify. The simplistic earlier view suggesting the sole negative factor to be modern economic growth with its

[6]Raymond Aron, *Les desillusions du progrès* (*Essai sur la dialectique de la modernité*), Paris, 1969.—"Can developing countries imitate the development patterns of the North? Even if they could, would this be desirable?" Mostafa K. Tolba, "Present Development Styles and Environmental Problems," *CEPAL Review*, No. 12, December 1980.

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concomitant goals of a rising material standard of living and steadily increasing productivity was not held to be tenable any more. It became obvious that a substantial widening of the scope of global environmental problems would have to be accepted.[7]

This broadening of the concept of environment did not concern only the enumeration of the branches where ecological hazards emerged and where they should be checked. The wider concept had its regional aspects, too. Parallelly, the specific environmental problems of developing countries came more into the focus and as the recent events have shown, they really will deserve close attention.[8]

Because of the magnitude of the specific environmental problems confronting developing countries and the lack of capacity of many of these countries to solve these problems alone, and given the fact that the proportion of population living in the third world countries is overwhelming and that this population is still rapidly increasing, the environmental problems of these countries are indeed problems of world concern. They may condition not only the well-being but likely also the very survival of mankind. Even if the rich of the world could free themselves from the feelings of solidarity with the poorer countries, they would act against their own long-term interests if they decided not to be involved in their solution at all.

Phenomena like large-scale deforestation, soil degradation and erosion, creeping desertification and a virtual collapse of capacities of vast areas to support life, which happen in third world countries, appear to be more ominous now as regards the survival of mankind than is industrial pollution. If pollution is a nuisance, desertification is a catastrophe. In the first case, high level of living is at stake; in the latter one, lives of millions of already destitute people. Pollution may be seen as a diseconomy which could be technically eliminated if there were enough investment to prevent it or to offset its consequences, and enough political will to support the necessary measures. Advancing deserts, however, are a deadly threat to life itself and to organized human societies.

The shift in the understanding of the environmental problems facing mankind which affected both the spectrum of these issues and their

[7]"... the character of the approach changed. A much broader conception of the environment was adopted.... It also turned towards the human situation ... and emphasized the relationship between the man-made and natural environments." *The State of the Environment 1972–1982*, Nairobi, UNEP, 1982.

[8]If industrial emissions continue to be the developed countries' major part of the environmental problem, there is another pollution which is responsible for the accumulation of ecological problems in the poorer South. "The phrase 'the pollution of poverty' ", notes the UNEP analysis, "came into use to describe the worst of all the world's environmental problems." *The State of the Environment 1972–1982, op. cit.*, p. 7.

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regional dispersion, ultimately led to a reappraisal of the role which could be ascribed to economic growth in the processes leading to the emergence of ecological problems and to their eventual solution.

The consensus seems to exist now that a country which lacks a vigorous economic growth will not be likely to allocate sufficient funds for the liquidation and prevention of ecological problems. The poorer a country the less will it be capable of combating its environmental problems in isolation and without external assistance. It seems that this statement fully applies to present-day developing countries and especially to their poorest and economically weakest category, to the thirty or so least developed countries.

The awareness of the necessary prerequisites countries should meet in order to be able to tackle successfully emerging environmental problems was taking shape only gradually. When apprehensions became denser at the onset of the ecological discussion of the early seventies that modern economic growth could be responsible for apparently increasing environmental instability one could hear nostalgic voices that an undeveloped country which had not industrialized was in a better position vis-à-vis the environment as it was not forced to pay the "ecological tax", the burden of which came to be increasingly felt in the industrialized countries.

Along with this economic aspect other advantages were quoted which a poor country living in age-old harmony with its natural environment could enjoy: the warmth of the social and family life for instance, or the absence of stresses and civilization diseases which are produced by the hectic activities of a rapidly progressing industrialized economy. There were a lot of really enviable things in the lifestyles of the poor South, the arguments concluded, and the absence of ecological problems resulting from industrialization was claimed to be the biggest asset of those who remained poor—usually, of course, against their own will.

At the same time, however, practical steps started to be adopted by industrial managers in the capitalist North to persuade the poorer countries of the South to accept some industries which were held to be ecological risks in the North. Such was especially the practice of many transnational corporations. The attitude of the North to the ecological risks in the South was therefore controversial. Industrialization of the third world countries which used to get just a lukewarm support earlier stopped to be recommended at all on the ground of constituting a potential peril to environment. Yet some industrialization was recommended in spite of that, and it concerned plants which were polluting their environment and which the North wanted to get rid of.

It should be noted, however, that many of the poorer countries tended to underestimate the perils inherent in ecologically risky industrialization.

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More often than not they identified any industrialization with modernization and material progress. Then they usually had been short on foreign exchange to pay for the equipment of plants to be imported. The transfers of ecologically risky industries to developing countries which were done by the transnationals were therefore often seen as welcome operations. Even if the developing countries were aware of the risks of industrial pollution, they tended to dismiss its gravity maintaining that there was a much greater danger in the form of widespread poverty which should be dealt with first.

> Environmental concern was therefore often dismissed as the business of the rich countries which caused most of the pollution and moreover had the wealth to cure it. . . . Indeed, arguments were presented to show that environmental concerns could well retard development efforts in developing countries.

There existed a strong

> temptation to industrialize by the cheapest route first and cure the resulting pollution afterwards.[9]

The transnational corporations profited therefore as far as ecological considerations are concerned from the fact that the economic weakness had compelled the third world countries to try to industrialize as much as possible without having to spend their own meagre resources. As for illustration, data of Table 1 are revealing, showing the instructive differential in domestic and overseas pollution-control expenditures of U.S. transnationals.

No matter how grave industrial pollution was or remains to be for the developed countries or for transfers of plant equipment to the third world, new and important areas of environmental concern emerged, as we have noted, all over the world in the course of the seventies. This had shed new light on the position of developing countries in respect of the global ecology.

3. *The Effects of the Oil Crises*

One could speak of a radically novel situation of the mid-seventies when the trends of demand and supply along with non-economic factors pointed out to the key importance of the so-called unrenewable resources for industrialized economies characterized by a high consumption of energy. The central theme in the confrontation over precious resources was oil in which a group of developing countries had attained a privileged resource position. These countries tried to make use of that special position in order to obtain from the capitalist North certain concessions they were interested in. Their price policy unfortunately did not hurt their adver-

[9] *Ibid.*, p. 6.

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TABLE 1

DOMESTIC AND OVERSEAS POLLUTION-CONTROL EXPENDITURES AS A PERCENTAGE OF TOTAL CAPITAL SPENDING BY UNITED STATES FIRMS WITH FOREIGN OPERATIONS

Industry*	1970		1971		1972		1973		1974		1975		1976		1977	
	US	O/S	US	O/S	US	O/S	US	O/S	US	O/S	US†	O/S	US†	O/S	US†‡	O/S
Iron and steel and non-ferrous metals	9.2	1.8	11.5	2.0	13.8	9.5	14.8	3.7	18.8	10.3	21.2	9.8	20.4	15.0	15.4	8.5
Fabricated metals	4.3	2.5	7.1	1.8	7.3	2.3	7.2	2.8	5.6	3.0	10.8	4.9	11.2	4.4	6.2	3.0
Stone, clay and glass	6.4	3.0	13.2	7.2	9.6	4.5	9.0	6.5	17.5	2.9	17.6	8.0	9.0	4.6	7.5	5.0
Chemicals	4.9	5.8	8.2	3.2	10.9	7.6	10.2	5.9	7.3	3.9	8.9	5.3	12.3	5.5	11.8	6.1
Paper and pulp	9.3	4.2	20.6	8.7	23.3	8.1	22.8	6.2	16.6	9.7	21.9	11.8	25.7	7.9	25.8	5.7
Rubber	5.3	3.2	5.4	1.1	5.8	1.1	6.2	3.1	3.0	2.2	4.8	2.6	5.7	2.7	7.3	3.9
Petroleum	6.0	1.9	9.0	5.6	10.7	8.3	12.7	7.4	7.2	5.3	12.8	5.1	7.5	4.5	6.4	4.7
Mining	6.1	3.5	2.8	2.1	5.1	1.5	7.6	4.8	7.0	1.8	8.2	3.9	6.9	6.2	7.0	12.7

Source: United Nations Centre on Transnational Corporations, *Environmental Aspects of the Activities of Transnational Corporations: A Survey*, New York, 1985.

US: domestic operations

O/S: overseas operations

*Industry classification is the same for the United States and overseas, except as follows: iron and steel plus non-ferrous metals for the United States (primary metals for overseas); fabricated metals for the United States (fabricated metals plus instruments for overseas).

†Including solid waste.

‡Planned.

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saries in the developed countries so much as did their natural partners in other developing countries. What is even more paradoxical is the fact that the attempts to raise the price of oil in order to achieve a redistribution of income between the producers of oil and their buyers had been only partially successful while hitting hard the ecology of the poorer countries which had no oil at all.

The petroleum-poor developing countries were less able than were the oil-poor rich countries to influence their own economic destinies. The enormously increased oil prices have affected the poorer developing countries both economically and ecologically. On the one hand, the rising oil bill contributed to the already high external indebtedness of the poorer countries. On the other hand, it has forced them to evert ever deeper to the habit inherited from the dawn of the use of fuels, namely to a more extensive use of fuel-wood. The ecologically relevant outcome from these constraints was therefore a devastating damage affecting the environment. As is well known, developing countries cannot solve conflicts resulting from energy constraints by drawing on the reserves of fossil fuels. They cannot do so simply because they lie in what has been called a fossil fuels desert.

Expressed in ecological terms therefore a conflict over a non-renewable resource which was crude oil affected among other objectives one it was not intended to hit, namely a renewable resource which is wood. It was of course not solely responsible for the ecologically disastrous processes of massive deforestation going on in developing countries but it gave them a strong impetus.

The use of most of the organic matter in developing countries as fuel at a time when the agricultural land is so much impoverished and when it would need precisely this organic matter to complement chemical fertilizer is a devastating practice which, however, cannot be easily undone

No doubt, precisely this is the most outstanding example of what is being called the "poverty trap" of developing countries. Conditions of extreme poverty coupled with ignorance may compel the people in developing countries to act in a way which will solve their immediate problems and satisfy pressing needs but imperil future prospects and thwart successful development in the longer perspective. It is, of course, disastrous to solve today's problems at the expense of tomorrow's development.

It is indeed a fascinating exercise to follow the interplay of factors in this interdependent world. The destabilization of prices of commercial energy which originally concerned the external economic balance of oil-rich developing countries ultimately contributed to the destabilization of the internal ecological conditions of oil-poor developing countries. This, of course, would not have happened if the extra income of the richer

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countries had been distributed among the poorer ones to compensate for the losses they were exposed to.

The awareness of the interaction between the non-renewable and renewable resources helped to shed a new light on the situation of the developing countries as regards global environmental problems. It enabled to understand the role of a factor opposed to rapid economic growth and industrial development—namely of the factor of underdevelopment and slow growth which is able to cause specific ecological problems and prevent a successful remedy when environmental destabilization manifests itself. It became obvious at the beginning of the eighties that more serious than industrial pollution and even more ecologically detrimental than the using of non-renewable resources must be a destabilization of the renewable resources of the biosphere. This is a menace to which all nations may be exposed. It already appeared, however, in the third world countries and it was facilitated by the overall backwardness and by a violation of the basic ecological principle of the carrying capacity which states that any species and its numbers are limited by their interactions with the given environment.[10]

At the beginning of the eighties constantly more signals were arriving from developing countries about the state of their environment, and more specifically about the state of the biosphere. As follow-ups to massive deforestations and widespread soil erosion, persistent droughts appeared which failed to be explicable by natural causes. Millions of people were starving to death because of the fact that the formerly agricultural land has been transformed into desert. Obviously, the centre of gravity of global ecological problems shifted from the industrialized countries to the developing ones.

This, however, is not intended to mean that all ecological problems of developing countries are caused by poverty, ignorance and wrong interactions with the natural environment. It cannot be denied that a substantial part of the environmental problems of the third world countries bears directly or indirectly upon wrong attempts to modernize stagnating economies and societies.

[10] "Living resources have two important properties the combination of which distinguishes them from non-living resources: they are renewable if conserved; and they are destructible if not . . . The activities of every organism modify its environment, and those of human beings are no exception. . . . People on the margins of survival are compelled by their poverty . . . to destroy the few resources available to them. . . . The 400 million tonnes of dung and crop wastes that rural people (in developing countries) burn annually are badly needed to regenerate soils already highly vulnerable to erosion now that the plants that bind them are disappearing." *World Conservation Strategy*, Gland (Switzerland), 1980.

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II. Deformed Modernization and Environmental Degradation in Developing Countries

The gravest ecological problems resulting from underdevelopment and ignorance appear in developing countries particularly where these specific factors are most pronounced, i.e., in the countryside and in the squatter settlements around urban agglomerations.

Chronologically taken, however, the first symptoms of environmental problems appeared in developing countries in about the same fields of activities in which they manifested themselves in the industrially advanced countries of the North. This has meant activities associated with what is being called the modern sector of the economies of the poorer countries, a sector therefore which has proliferated as a result of the controversial influences of capitalism on backward economies and societies.

It is not just the environmental impact of institutions which belong to the modern sector—factories built by transnational corporations for instance—but the general ecological influence of programmes aimed at attaining modernization in developing countries what ought to be studied. It should be emphasized in this context that the processes of modernization in many third world countries were virtually imposed on from abroad and could be more properly termed as attempts to "westernize" which is not necessarily identical with modernization. The historical processes and stages through which advanced capitalism passed in its recent development were claimed to represent an appropriate model for all developing countries emerging from age-old backwardness.

A genuine modernization which ought to be understood as a broad acceptance of highly productive modern technologies and organizational experience encountered, however, in developing countries a number of serious constraints. They included financial and cultural problems, lack of skilled manpower and managerial expertise, limited internal and protectionist external markets, and aid programmes which were not only insufficient in size and structure but which were to stress foreign interests rather than the national ones. It may be argued that this confrontation of modernization efforts and serious obstacles standing in the way of their implementation paved the way for a compromise—a deformed modernization—which remained a far way from the original intentions to bring about a tangible improvement, and which moreover negatively impacted upon the environment of third world countries.

1. *Ecological Hazards in Industrialization*

One of the spheres of the modern sector where negative effects were discernible first was, of course, that of industrial development.

Doubts started to spread as early as 1975 when at the Lima confer-

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ence the developing countries adopted a highly ambitious target which called for the attainment of a quarter of the world's industrial production by the year 2000. This goal, especially if measured against the meagre less than 9 per cent of this share attained in 1975, meant that the developing countries were determined to do everything to achieve this target, and possibly ignore also ecological risks which would stand in the way of speedy industrialization. A conviction started to gain ground, too, that industrial pollution's danger had been grossly overexaggerated. At an international conference a delegate of Sri Lanka even proclaimed that developing countries would be willing to accept all the world's industrial pollution if this enabled them to industrialize as quickly and as cheaply as possible.

This attitude will help to explain why the transnational monopolies were able to transfer to developing countries—apart from the much publicized cases of labour-intensive international subcontracting—especially the plants capable of causing environmental degradation, such as petrochemicals, metallurgy or chemical industries the ecological impact of which had been already seen as intolerable in advanced countries of the capitalist North.

If, on the other hand, developing countries started to industrialize on the basis of their own programmes and of their own financial resources, they tended to prefer cheaper technologies even if these were not so much environmentally "clean". The criterion of price and of payment conditions usually prevailed over the criterion of ecological feasibility.

Partly also because they were lacking adequately trained specialists, developing countries did not ask foreign suppliers to strictly comply with the norms and precautions which would prevent an eventual ecological damage—the practice which probably helped to open the way to the catastrophe of Bhopal.

Against criticisms that ecologically hazardous transfers of industrial technology to the developing countries ought to be avoided, the objection was frequently raised that a relatively rarely populated environment which features the majority of developing countries would always be able to neutralize or absorb all or most of industrial pollution. On the other hand, the environment of the developed countries was said to be too densely populated to accommodate further pollution.

These arguments are now seen as fundamentally wrong. The environment of the moderate climatic zones with sufficient and regular rainfall is seen to be better able to neutralize pollution than are the humid tropical zones or the dry subtropical zones with uneven rainfall and massive evapotranspiration. A steady supply of water is, of course, a precondition for the operations of most modern industries. As a matter of fact, many industries were devised in a way as to function well in the moderate climate and it may be counterproductive to locate them for instance in

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the tropics without the indispensable modifications and technical adjustments. And if the rivers in the dry areas lack regular water supply and if for different reasons the effluents from the industrial plants are allowed to flow into them the public health may be endangered because most of the rivers and streams in third world countries are sources of drinking water for the peasants.[11]

Various industrialization alternatives used to be proposed for developing countries: big industrial plants against small scale industries for the rural areas, or highly modern technology which might be financially prohibitive even if very productive, and somewhat outmoded plant equipment which was cheaper and allegedly also more in conformity with the developing countries' lower level of skills and pressing social need to offer more employment in preferably labour-intensive production.

Environmental considerations have added to them the criterion of ecological feasibility. This is a notion stretching from health safety—the case of Bhopal has shown how important a consideration this is—to the concept of appropriate technology. The protagonists of "ecodevelopment"[12] have been stressing the need to devise "a new tropical industrial civilization adapted to Third World ecosystems and founded on local technologies".[13]

2. *Ecological Hazards in Modern Sector Farming*

While of course industrialization received in the development programmes of third world countries a clear priority, an important part of modernization efforts was also geared to agriculture, at least to its state-controlled model, state farms, training centres and the like. The ultimate goal was to increase the overall productivity of agriculture which still constituted 70–90 per cent of economic activities in the poorer developing countries being in spite of that unable to feed adequately the minority of population living in urban agglomerations. It seems, however, that the modernization efforts aimed at substantially increased agricultural productivity suffered some basic distortions right from their conceptions.

Finding themselves in a chronical dilemma between a rising demand for foodstuffs and an inability to satisfy that demand on the basis of domestic production, the decision-makers in a number of developing countries became convinced that the solution lied in a substantial increase

[11] *UNU Newsletter*, Vol. 7, No. 2, May 1983.

[12] "Ecodevelopment is a planning approach which carries over . . . into cultural ecology. . . . It argues for the individuality of ecosystems, the uniqueness of cultural contexts and the many possible paths to development." Ignacy Sachs, "Environment and Development—Key Concepts for a New Approach to Education", *Prospects*, Paris, UNESCO, No. 4, 1978.

[13] Ignacy Sachs, "Development Strategies with Moderate Energy Requirements: Problems and Approaches", *CEPAL Review*, No. 12, December 1980, p. 105.

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of the use of chemical fertilizers. One could easily point to the still very low levels of the application of such fertilizers in third world countries, if compared with the practice prevailing in economically advanced countries of the North.

Partly also because it was virtually impossible to break the habit of using organic waste and dung as fuel—and by the way there was no substitute for this primitive fuel within easy reach of the impoverished masses—a logical conclusion seemed to follow that the best agricultural practice, which was all the more in conformity with what the economically advanced countries have been doing for decades, was to go on increasing the inputs of chemical fertilizers into the agricultural land. Yet this practice proved to be environmentally rather hazardous.

The environmental hazards did not stem from the quantitative aspect so much—the amount of fertilizer used in the third world countries, and especially in Africa and South Asia, is still very low if compared with the developed countries—but rather from the fact that they were one-sided, not accompanied by inputs of organic matter into the very vulnerable soils of the tropical and subtropical countries. Whereas agricultural experts have for long been suggesting that a more balanced application of chemical fertilizer and organic matter was needed to improve the soil quality, an opposite viewpoint seems to have been adopted in many developing countries, namely that the use of fertilizer *per se* was sufficient to augment the agricultural productivity in the short as well as in the long run.

Stuffing soil with chemical fertilizer is, however, a policy which cannot but deteriorate the quality of soil in the long run, even if there can be some spectacular initial successes. It is environmentally risky especially in respect of the quality of soil in many developing countries and to its exposure to intensive solar irradiation, water and wind erosion.

A balanced application of chemical fertilizers with organic matter and animal dung in making the soil in developing countries more fertile[14] is unfortunately not just a question of persuading the peasants of its profitability as far as higher yields are concerned but also that of offering viable alternatives to the existing energy options. The choice among

[14] "To avoid aquatic pollution and to conserve inorganic fertilizers, crop residues and livestock wastes should, as far as possible, be returned to the land. . . . Many tropical soils quickly lose their fertility. Traditional system of shifting cultivation restored fertility by leaving the land fallow for long periods, but fertilizers are indispensable for continuous cropping. . . . In many areas, even when inorganic fertilizers are readily available, they should be used only in combination with organic fertilizers. For example, the dominant caolinitic clay soils of the humid tropics have low absorption capacity, and chemical fertilizers need to be combined with orgainc manures to be fully effective." *World Conservation Strategy, op. cit.*

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potential fuels for households is limited. There exist, however, possibilities to increase the effectiveness of the fuels which are being used now. This may also lessen the dependence of agriculture on chemicals.

In order to increase agricultural productivity, developing countries began to rely therefore rather too heavily on the use of chemicals in agriculture, including the control of diseases, pests and weeds which thrive in the hot climate.

The domestic production and imports of pesticides, fungicides and herbicides were by all means encouraged while the ecological hazards involved in their extensive use tended to be played down. It is certainly more than a coincidence that the big ecological catastrophe in India's Bhopal occurred in a plant imported from the United States and producing pesticides. The subsequent investigation also showed that the deadly methylisocyanate which leaked from the plant was not under sufficient technological control as the respective regulations were not adequately complied with.[15]

The tendencies towards an increased use of chemicals in the agriculture of third world countries, both as fertilizers and as herbicides, were even more strengthened by the circumstance that in the sixties the so-called miracle seeds had been developed and started to be introduced in a number of South Asian, African and Latin American countries. The attention of the experts and of the public at large was mainly focussed on the HYV (high yielding varieties) of rice and wheat.

So as to be able to make full use of the high productive potential of these varieties it is, of course, imperative to use more fertilizers—which for the sake of modernity was interpreted as using more of chemical fertilizers—together with pesticides and herbicides. The pursuit of higher agricultural productivity which was implicit in the planned divulgation of the high yielding varieties of seeds and which was seen as an important factor of overall modernization therefore contributed to a one-sided chemization of the agricultural land, menacing to throw the ecology off balance.

Even when disregarding the modernization efforts which were behind

[15] "With the death of about 2,500 people and 50,000 more maimed along with the dislocation of 150,000 people in Bhopal . . . the accident at the Union Carbide plant was the worst man-made industrial disaster in the history of industrialization. . . . It is clear from preliminary information that negligent safety standards along with a host of other factors led to the methylisocyanate gas explosion. . . . Bhopal . . . is one of the fast industrializing cities of India with 900,000 people and growing at the rate of about 4 per cent a year. Bhopal's population will be near 1,8 m by the end of the century. Almost 50 per cent of the growth of the city is due to incessant migration from the country-side—rural refugees settling in any open land, setting up shanties with horrible conditions in search for survival." *Development Forum*, Vol. 13, No. 2, February-March 1985.

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the introduction of the miracle seeds and which were turned into practice in rather problematic ways, one will be able to find other stimuli which may have been responsible for the steep rise in the use of chemicals in the agriculture of third world countries. These countries have no problems with what had been termed as unlimited supplies of labour, yet there is a traditional tendency, supported by a mirage of modernization now, to prefer everything that is rather easy, and in fact less labour-intensive. The use of manure, or of composting, as fertilizers is more tiresome than the use of chemical fertilizers, and the biological control of pests is a very complicated procedure as compared with the simple and seemingly highly effective application of the respective chemicals.

Relying excessively on the chemical pest control may, however, become self-defeating. As has been pointed out recently there appears to be a tremendous increase of pesticides-resistant insects.[16] The easier way of doing things will therefore in the final analysis prove to be an exercise in futility. That is why the experts of technical assistance as well as the research centres of many developing countries have started to focus on various traditional agricultural methods which they instinctively felt as being in harmony with the prevailing ecological conditions of the tropical and subtropical climates. The age-old accumulation of production experience, even if it was done on a pre-scientific base, is definitely not something to be dismissed as being too primitive to merit serious attention. An optimal blending of traditional farming methods and of the modern techonologies obviously provides a clue to the solution of the problem how to substantially increase agricultural productivity without destroying the vulnerable ecological balance.[17]

If the programmes of ecodevelopment were stressing the desirability of devising specific tropical and subtropical variants of industrialization, the more it is valid to envisage an agriculture the production methods of which would be wholly adapted to the countries of the hot climate while at the same time being increasingly productive in conformity with the steeply rising demand. The need to reconcile high agricultural productivity with ecological equilibrium is nowhere as great as in today's developing countries. "Easy" solutions disregarding the laws of the biosphere are doomed to failure.

If due interest and care are not given to the specific features of the developing countries' environment and if the most appropriate methods are not chosen to use the soil and to protect it at the same time, efforts to increase agricultural productivity may be thwarted by a general degra-

[16]The number of pesticides-resistant insect species has increased from 25 in 1954 to 432 in 1980. *Development Forum*, Vol. 13, No. 2, February–March 1985, p. 10.
[17]*The Ethiopian Herald*, Addis Ababa, July 6, 1986 ("Tapping the Peasants' Wisdom").

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dation of soil, by its increasing salinity, lateritization and alkalinization.

3. Exports, Urbanization and Deforestation

The so-called modern sector of developing countries which tends to be oriented more towards the foreign markets than towards the local traditional sector, frequently responds to foreign demand by exporting the items which belong to the specific natural environment of the countries situated in the hot climate. The extensive exploitation of such resources and of an export of part of them abroad, however, often mean a degradation of the local environment with incalculable ecological consequences. The necessity to obtain a steady source of the much needed foreign exchange to cover the costs of industrialization lies usually at the root of these efforts.

The extensive exploitation of the tropical forests in the Amazon basin and in tropical Africa is being quoted as an example of this misled policy which wants to buy modernization at the cost of ecological stability. The export-oriented exploitation of the tropical forest, however, represents only a fraction of the phenomenon of deforestation in the third world countries, not exceeding probably 10 per cent of overall deforestation. In some regions of the developing world, however, it is so much concentrated that it gives rise to apprehensions that it will result in changes of climate affecting vast areas.

For a country like Brazil which is at present one of the most heavily indebted countries of the world the receipts of foreign exchange resulting from the exports of tropical timber represent something that cannot be easily replaced by other potential export items. Yet one would hesitate to say whether such an export policy constitutes a good application of comparative advantage. The Amazon basin is said to be deforested at the rate of several percentages of forest area a year.[18]

The World Conservation Strategy stated in 1985 that the triopical forest was annually liquidated on an area of 11 million of hectares. The overall deforestation in developing countries, due of course mainly to the use of wood as fuel has been estimated by FAO to constitute on the average 0.6 per cent a year. The concrete examples of some countries are

[18] "Logging in itself cannot be considered a direct cause of deforestation. Nevertheless, it opens tracks into the forests which are often used subsequently by human settlers with consequent further forest degradation. In Africa and Asia 70 per cent of the deforestation occurs in areas that have previously been logged. In America the figure is only 44 per cent, because most logs are transported by rivers or along existing roads." *The State of the Environment: Selected Topics 1983*, Nairobi, UNEP, April 13, 1983, p. 8 (NNEP/GC II/4/Add. 1, Supplement).

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even more telling.[19]

The rate at which the forests in developing countries are being exploited, however awesome it is, need not spell disaster should the rate of replacement of the felled trees be commensurate to the rate of exploitation. There are however too few newly planted trees in proportion to those felled. The estimate of FAO is that there is just about one newly planted tree replacing ten trees felled in the tropical forests of the developing countries taken as a whole.[20] In Africa, the environmentally most problem-ridden continent, the proportion, or rather disproportion, is 1 to 29. It is high time that these trends are reversed.

The processes of industrialization tend to be identified as a rule also with urbanization. This is usually viewed as a phenomenon which, if the historical example of today's developed countries is to be invoked, accompanies the transfer of the point of gravity of economic activities from the rural areas to the urban centres, and from agriculture to industry.

The patterns of contemporary spontaneous, and on many occasions also chaotic, urbanization in developing countries, however, differs substantially from what may be called classical. A new name has been even proposed to distinguish the past patterns from the present ones: spontaneous internal migration for instance, or a migration from the rural areas into the urban agglomerations where a "city sprawl" is registered

[19]According to FAO, the countries of Central America with the possible exception of Panama may lose all forests within 50 years or less. One half of Africa's deforestation is concentrated in as few as 9 countries and almost one half of this continent's wooded area may be lost within the last quarter of this century. Since the beginning of this century Ethiopia which is estimated to have had about 40 per cent of its territory covered by forests has lost all but the last remaining 3.5 per cent. Sri Lanka may lose all valuable tropical forests within a period of 20 years.

[20] RATIO OF DEFORESTATION TO PLANTING (1981–1982)

	Annual deforestation		planting	Ratio of total tropical forest deforestation to planting
	closed forest	open forest		
	(Thousands of hectares)			
Tropical Africa	1,331	2,345	126	29 : 1
Tropical Americas	4,315	1,272	535	10.4 : 1
Tropical Asia	1,826	190	438	4.5 : 1
Total	7,472	3,807	1,099	10.3 : 1

Source: The State of the Environment: Selected Topics 1983, op. cit., p. 14.

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here. And as such congested agglomerations have by no evidence the same socio-economic function the urban centres in Europe or in America used to have, some would propose to apply the notion of "town" in developing countries today only to habitats exceeding 20,000 inhabitants.

It was already Myrdal as early as in the sixties who pointed to the specific traits urbanization in developing countries of South-East Asia had as against the historical experience of the presently developed countries of the world. Two of the earlier stimuli were obviously lacking now. One of them was represented by the fact that the South-East Asian urbanization was "not accompanied by significant industrialization" while the other consisted in an absence of an "increase of agricultural productivity" being great enough to feed all those who have decided to migrate into the urban agglomerations.[21] This type of urbanization thus represented "more a reaction *against* the lack of vigorous economic growth than a response to rising levels of income per head".[22]

Without being able to enlarge their area of influence because they lack enough of real economic attraction and dynamism, the cities in developing countries rather radiate just a promise of certain illusory expectations which are sufficient to appeal to the impoverished masses from the rural areas. The net result is nothing but a shift of poverty from the countryside to the cities and a virtual degradation of the social role of city centres. Especially the squatter settlements around the capitals and other town agglomerations are horrible examples of the decline in both the quality of environment and the quality of life of the human beings.[23] One might even claim that this "crisis flight" from the rural areas to the outskirts of expanding cities is not a process of urbanization but rather that of a "ruralisation" of cities. The migrants, being unable to find adequate jobs, virtually bring the whole of their rural culture into the cities and impregnate them by it.[24]

When the rural poor became urban poor they did not change their consumption habits and in fact they were unable to do so. The squatter settlements around the cities are therefore crowded not only by destitute humans in search of any kind of job or handout but also by numerous and underfed livestock, including the cows, goats, sheep,

[21]Gunnar Myrdal, *Asian Drama—An Inquiry into the Poverty of Nations*, New York, 1968, pp. 467–468.

[22]*Ibid*, p. 471.

[23]The number of inhabitants of the cities in developing countries has been increasing at the rate three times exceeding the already very high population rate. In the seventies the urban population in the third world countries rose by 30 per cent.

[24]The unemployment which was concealed while the migrants were still living in the rural areas, has become open when they swarmed the cities. It is claimed that in Sao Paulo alone there are 1.2 million of unemployed.

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poultry. The women in the households of the urban poor are daily engaged in collecting firewood. Because there are so many of them living on the outskirts of the cities and they go for dozens of kilometres to get the ever rarer fuelwood, there are ever-widening circles of treeless zones around these cities.[25]

It is estimated that for instance in Africa where the shortage of fuel is most acute every fourth member of the household is engaged daily in the collection of fuelwood. For the most part it is a lot of the women who start as early as 3 a.m. in order to bring from walking distances of up to 50 km the ever scarcer firewood in packs weighing 30 kilogrammes or more. Because of the high demand for fuelwood in urban areas much of what is thus brought into the cities finds a ready market and is sold for cash. The price of fuelwood in Addis Ababa is said to have doubled in less than one decade. The surroundings of the cities acquire such a desolate look also because the collection of firewood has been completely spontaneous and free: the women usually tore off the branches of the trees or cut younger trees with knives. Only now there are attempts to reduce the damage caused to the Nature by means of fuelwood plantations projects.[26]

In spite of the fact that the so-called modern sector takes up only a minor segment of the economy and of the economically active population in developing countries, the activities of this sector—which are being deformed by poverty, cultural backwardness, necessity to satisfy the steadily increasing human needs—are causing a disproportionately big damage to human environment. If to these man-made[27] damages specific

[25] "Around one fishing centre in the Sahel region of Africa, where the drying of 40,000 tonnes of fish consumes 130,000 tonnes of wood every year, deforestation extends as far away as 100 km." *World Conservation Strategy, op. cit.*

[26] "The Addis Ababa Fuelwood Plantation Project launched at a cost of 50.3 million birr would help alleviate the city's Fuelwood shortage by providing it with about 45% of firewood and construction materials by the time it is fully implemented. [Its purpose] is the establishment of 15,000 hectares of fuelwood plantations in the course of five years (mainly the rapidly growing eucalypti). The project's total output would rise from 154,000 cu m. and to 318,000 cu. m. 18 years later, a sustained yield of 217,000 cu. m. could be obtained." "The main economic aim is to keep the retail price of firewood which is 25 birr per cu.m. at the present level." Makonnen Haila, "Project to Alleviate City's Fuelwood Shortage", *The Euthiopian Herald*, July 14, 1985.

[27] The rising tide of poverty flowing into the cities from the countryside contrasts all the more with the privileged position of a narrow stratum of the rich. These people have adopted lifestyles reminiscent, on the one hand, of what the departed colonizers have left as their specific cultural heritage and, on the other hand, of the lifestyle of the former royal court. There exists a conspicuous wastage of scarce resources which in the vicinity of abject poverty is all the more provocative, and types of consumption prevail which under an absence of adequate infrastructure spoils the

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natural and climatic conditions are added which make the environment in the hot zones easily vulnerable the conviction will emerge that a misled modernization is capable of constituting a grave obstacle on the road to sustainable development.

In the final analysis therefore it is poverty and backwardness what virtually dictates the developing countries the adoption of a deformed variant of modernization. They have been pushed into it by unfavourable circumstances and foreign influences. Irrespective of how good were the original intentions of those who "devised" the strategies of modernization, they have also contributed to the emergence of quite serious environmental problems.

III. Environmental Destabilization in the "Traditional Sector" of Developing Countries

The greatest part of what is being termed the traditional sector of developing countries is in the backward rural areas, although the sphere of this sector should very probably encompass also the urban poor and even a part of the small producers living in urban agglomerations. Anyhow the bulk of economic activities associated with the traditional sector is low-productive agriculture. In the poorest developing countries 70 to 90 per cent of the population earn their living, or rather subsist, in this sector.

When speaking about the negative environmental influences of deformed modernization we should not overlook that the impulses for it usually originate in the traditional sector. Its backwardness, self-contained character, inertia have stimulated efforts to accelerate development processes by means of crash modernization programmes. It is therefore not so much modernization as a goal in itself, but modernization as a desperate response to socio-economic immobilism and stagnation. If the modernization efforts are accompanied by various side-effects which seriously damage the environment, the more far-reaching must be the environmental impact of the traditional sector the size of which is so great in developing countries and in which the relationship of human demand to reproducible resources is undergoing its critical test right now.

The development theories of third world countries had to assimilate recently a new concept which originated in the ecology. It is a concept of carrying capacity. It was used to describe the limits to which the impact of the living organisms on their environment may expand and which cannot be transgressed unless the reproductive capacities of the environ-

environment in the urban centres of developing countries even more than it would be able to do in more developed countries. The residential quarters of the rich in the cities of third world countries, where the lifestyles of the suburbia of advanced capitalism are to be imitated, have in reality become isolated and beleaguered islands of wealth in the sea of poverty and squallor where the actual way of life is inexorably nearing that of the "fortress societies".

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ment are irreparably damaged, Now the concept of the carrying capacity has to be applied to the behaviour of populations living in the traditional sector of the developing countries. This behaviour is evidently conflicting with the carrying capacity of the biosphere.

Generally speaking the carrying capacity is understood as a property of a given environment to withstand and absorb the ecological impact of living organisms which interact with it through the consumption and production activities as well as through the creation of waste. This capacity is elastic to a certain extent and the elasticity may be further improved by appropriate measures, or again damaged by improper actions. It also depends to a large degree on conditions of climate, rainfall, topography, type of soil. If the stress exceeds acceptable proportions, however, the carrying capacity of the environment will not be able to withstand the stress any more and may collapse.[28]

1. *Population Pressures on Environment*

The carrying capacity of the natural environment in the rural areas of developing countries has been exposed for too long a time to an increasing load of the numbers of human and livestock populations. In speaking about the carrying capacity it is not possible therefore to omit the population issue which is inseparably intertwined with the environment.

Even if some viewpoints persist that there is no real threat of overpopulation in the third world countries—theoretically the agricultural land in Africa could be increased three times, provided of course there are enough financial resources to invest in costly soil improvement and irrigation projects—it is difficult to minimize the role of population pressures in the face of a degrading and destabilized environment. Especially in the traditional sector of developing countries the populations' impact on the environment is felt strongly because the populations have been increasing rapidly and because their interactions with the natural environment have been so intensive.

The central lesson of the ecology about a definite ceiling as regards the numbers of organisms interacting with a given environment can be modified under certain circumstances. These include, as human societies are concerned, the possibilities to move forward to more advanced and sophisticated organizational forms and to the use of more innovative technologies which would be better suited to the environment. Under such conditions the carrying capacity of the environment is able to improve. But if the socio-economic structure remains the same and the technologies do not change while the quantity of population and of its

[28]F. S. Kiros, *Education for Integrated Rural Development in Ethiopia*, Addis Ababa, Institute of Development Research, Addis Ababa University, 1983.

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demand is constantly on the increase, the "outer limits" may be reached relatively soon.

The rising numbers of population are, however, rather a consequence than the underlying cause of ecological disequilibrium. The real conflict is between the cultural backwardness of the rural masses and their environment with which they interact. The cultural backwardness contains attitudes, motivations, prejudices, superstitions which are opposed to rational behaviour and to a real modernization of perceptions and world outlook. If the population is increasing at a pace which is outstripping the real possibilities of the low-productive economy and if because of this the means are unavailable to improve their cultural standards, the same pattern of a cultural backwardness of increasing population being in constant conflict with their environment will have the tendency to reproduce itself in the future, too.

The earlier development theories tended to consider traditions and innovations in developing countries only in relation to productivity. The ecological lesson the world has been learning since the decade of the seventies suggests rather to view these components of the cultural superstructure in relation to the environment and its laws.

The reproductive behaviour of the poor masses in developing countries was frequently analysed in respect of some population theories, notably the one known as the demographic transition theory. This theory held that an increase of population was an inevitable and natural consequence of raising standards of living which a successful economic take-off would offer to a nation. The theory implied, however, that after a temporary increase of the size of population when the broad masses have become aware by their own experience that it pays to have less children and that a high material standard is incompatible with too many of them, the population size would become stabilized as the birth rates would adjust to declining mortality rates—both tendencies being a response to improved hygiene and more rational ways of thinking.

It was claimed that such a scenario could be expected to work in developing countries today just as it worked in Europe or Japan generations ago. The essential point in the demographic transition theory was the belief in the spontaneity of response of the widest strata of population to material incentives and the belief in the natural adjustment mechanisms governing the reproductive behaviour of nations in all parts of the globe. A certain population growth was said to constitute a corollary of development but it should come to a halt by itself once all realize the advantages of a higher material level of living as well as the fact that due to improved hygiene, families, tribes and nations are certain to survive even if much less children are born than before.

The historic experience with the reproductive behaviour in the coun-

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tries which are now industrialized and economically developed did not, however, repeat itself in most of the third world countries. These countries did not comply with the allegedly universally valid scenario. There is a continuing demographic pressure despite the fact that most of the countries did experience at least some improvement in material standards. It is especially in the traditional sector, or in other words in the rural areas, where the reproductive behaviour seems not to have been too much affected by the changes brought about by development processes.

One explanation of this phenomenon may be sought in the cultural sphere. Those exposed more to traditional attitudes than to modern rational thinking are perhaps living "immersed in the past", as Nehru put it,[29] for a much longer time than was expected by those who studied the impact of the first Industrial Revolution on demographic tendencies in Europe or in Japan.

Besides the cultural sphere there are other areas where the scenarios on the basis of the theory of demographic transition were not performed in the developing countries so as it was foreseen. The important incentive which was believed to exist in a rather pronounced increase of the standards of living remained a long way from the original expectations.

In contrast therefore to the present-day industrialized countries which were able to register in crucial periods of their take-off a relatively sudden and substantial increase of their material living standards, while their broad masses reacted to the improved standards accordingly in their reproductive behaviour, the developing countries in the recent decades rather experienced a certain compromise. The rise of their material levels of living was rather weak and therefore unconvincing as far as the possible responses are concerned. Even more important was perhaps the fact that due to an uneven distribution of the fruits of economic growth its impact was felt least in the most backward sphere of third world countries which was their traditional sector. While the revolution in the hygiene brought the death rates to unprecedentedly low levels, the birth rates declined only slightly.[30]

These diverging tendencies of mortality and fertility could not remain without repercussions on the carrying capacities of the natural environment in the rural areas of developing countries.

One will see how the changing population size intervenes in the relationship of man and his environment if for instance the case of the so-called shifting cultivation is considered.

The principles of shifting cultivation were obviously adopted by

[29] Jawaharlal Nehru, *The Discovery of India*, 3rd ed., London, 1951, p. 6.

[30] *L'évolution des théories et des politiques relatives à la population dans la planification du développement*, Commission économique pour l'Afrique (E/ECA/PSD. 3/38), 9 décembre 1984.

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primitive communities all over the world almost instinctively because they warranted a certain agricultural productivity together with ecological stability. As for the tropical countries today the shifting cultivation still provides the livelihood for some 200 million people living in the area of the tropical rainy forest. As is well known, the practice of shifting cultivation consists in the clearing of a part of the forest, usually by fire, in the cultivation of this area for some three or five years while the soil still retains its natural fertility, after which the land is left for some 10 or 20 years to be covered by trees and shrubs again and to regenerate.

The agricultural practice has worked since the neolithic and would continue to be both productive and ecologically stable if the population which interacts with its natural environment also remained more or less stable. This has unfortunately not been the case.[31]

The continuing practice of shifting cultivation, which itself confirms the inertia prevailing in third world countries and a reluctance to adopt new and more productive technologies, may still be tolerable in the tropical rainy forests despite the increasing population pressures but is definitely disastrous in the zone of the dry open forest, that is, in the semi-arid regions. The deforestation of the dry areas, especially if they are hilly and therefore more prone to erosion, is a self-defeating practice in spite of the fact that at the beginning more of the land is turned to agricultural use and more people can be supplied with food.

The carrying capacity of the dry, semi-arid zones obviously differs from that of the rainy tropics or from that of the moderate zones. The specific characteristics of each environment have to be carefully studied and respected. There is room for manoeuvre between the "inner limits" which mean guaranteeing the production of the basics of life for all, and the "outer limits" which mark the boundaries to which ecologically still permissible economic activities may be allowed to reach out. Beyond them there is destabilized ecology with shrinking economic returns and eventually the collapse of both the ecology and the economy.[32]

[31] "If populations are growing . . . the pressure on land increases, fallow periods shorten, the soil has no chance to regenerate, and wider and wider tracts of otherwise productive forest land are destroyed. . . . In the Ivory Coast, shifting cultivation reduced the forest cover by 30% between 1956 and 1966 and now only 50,000 km² remain out of the 150,000 km² that is believed to have existed at the beginning of this century." *World Conservation Strategy*, *op. cit.*

[32] "Desertification in particular has assumed alarming proportions. . . . Because of overuse and misuse of land extensive areas have been degraded in the extreme to non-productive desert-like conditions. . . . Environmental problems such as drought and desertification have aggravated socio-economic problems in Africa." "Environmental Protection" (Editorial), *The Ethiopian Herald*, June 7, 1985.

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2. *The Relevance of Traditions in Preserving the Ecological Balance*

The relevance of traditions reflected in the consumption and production patterns and confronted with the need to maintain ecological stability is therefore not a simple and clear-cut one. The method of trial and error led to the establishment of traditions which guaranteed a harmony with the environment, and they were built into the lifestyles and the culture. Complying with these traditions promised, *ceteris paribus*, an ecological stability. But if other things and circumstances did change, like in the case of a substantial population increase, the stability based on the old traditions was gone. Changed conditions and circumstances called for a new copeability and for a readaptation of traditions and the collective know-how to the changes. Precisely this is what is still very much missing in the traditional sector of developing countries.

The peasants have been taught by experience and logic that if there are more stomachs to be fed the production of foodstuffs must be greater, and if the production technology remains more or less the same the land under cultivation must be increased. If, however, because of that vast tracts of forests will be cleared and the soil denuded and exposed to erosion, the opposite effect will be achieved, namely the degradation of soil and a decline of the production of foodstuffs.

Cultivating the slopes in the highland areas of the tropical and sub-tropical countries with one-year crops is an ecologically risky venture as it opens the door to erosion. No tradition, however, tells the African peasant to make the terracing of the slopes in order to prevent the rains from washing down the topsoil. Terracing is obviously a new agricultural production method in Africa which the peasants are accepting only now and which will have to become a new component part of their collective know-how.[33]

Another good example of the relevance of traditions for ecological stability is the lifestyle of the African nomad. He was frequently portrayed as a barbarian who just collects the scarce fruits in the semi-arid zones, never does anything productive and thus contributes to the spreading of deserts. He was therefore seen, to use a fitting metaphor, as a "father of the desert".

The more recent opinion about the ecological relevance of the lifestyle of the nomad is, however, the opposite one. He is rather viewed now as a docile "son of the desert" whom an age-old wisdom has taught how to

[33]We are "seeking a lasting solution through rehabilitation schemes, including resettlement and environmental protection. Environmental rehabilitation schemes involve the vigorous reforestation programme [and the covering of] denuded areas with vegetation. Soil conservation project is being carried out as is also terracing." "Issue of Top Priority" (Editorial), *The Ethiopian Herald*, June 19, 1985.

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adapt his lifestyle, his consumption and production patterns, as well as his reproductive behaviour to the carrying capacity of the semiarid zones. He has learned to live with ecological laws which he had found out instinctively. The ultimate test of his learning was that he survived in an environment which was held to be hostile to human beings. The main capability the nomad developed was adaptability, the top quality in the eyes of the ecologist to guarantee survival.

It is rather the sedentary agriculturist who is likely to adopt a lifestyle which may conflict with the carrying capacity of the environment. He will probably denude the area in search for more land under cultivation and for more of agricultural production. His reproductive behaviour rather frequently throws the demographic situation off balance. The extreme population density in the intensively cultivated basins of big rivers like Nile or Ganges is a proof of this. The deserts will not appear there because the areas are humid. But because the carrying capacity is very likely to be destroyed under the load of populations there will be a degradation of soil fertility—a process similar to desertification.

As mentioned already, developing countries are confronted with very limited options as far as the domestic supplies of fossil fuels are concerned: most of them in fact lie in what has been called a fossil fuels desert.[34] The rather weak economic condition of the majority of developing countries prevents them from importing commercial energy in sufficient quantities from abroad. The "poverty trap" in which they find themselves has been forcing the poor masses to burn all available wood and organic matter in their households for cooking and heating,[35] and consequently to behave in a way which is bound to be detrimental to their long-term economic interests.

A lasting solution is sought which would not destabilize the balance of the biosphere in the third world and which would not demand the very scarce fossil fuels. Some would say it consists in a wide utilization of solar energy.

If anywhere in the world, this energy should be abundant precisely between the Tropics of Capricorn and Cancer. In contrast to solar energy, other "new and alternative" energy sources, like the geothermal energy which is largely still untapped, the hydroenergy and the wind energy would need massive investments for which the financial means are unavailable. Apart from solar energy, biogas is said to represent a new and promising energy source, too.

[34] *National Geographic*, Special Report, February 1981, p. 21.

[35] It is estimated that in developing countries more than 1,500 million people depend on wood for cooking and heating. "In Africa the contribution of trees to total energy use is as high as 58%; in Southeast Asia and Latin America it is 42% and 20% respectively." *World Conservation Strategy, op. cit.*

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Some time ago these non-traditional energy sources seemed to be more promising than now. Some obstacles of the technical and notably cultural order have been discovered which may make their wide application in developing countries very problematic and postpone for instance the "solar age" to the next century.

Starting with biogas, its production needs besides organic matter or animal dung sufficient quantities of water which is unavailable in the semi-arid zones like the Sahel. There are no inhibitions in China concerning the use of animal dung as the primary energy source. In African countries, however, the local culture would object against the use of this source of energy for the preparation of food. Cultural limits emerge therefore against the use of non-traditional energy sources and it would be unwise to dismiss their importance.

As far as the solar energy is concerned, it has a grave handicap in that it cannot be stored. Solar cookers may therefore be used only at daytime and the energy thus produced must be utilized without delay. Moreover there are vast differences between the effectiveness of solar cookers on days full of sunshine, and on windy days when the sky is cloudy, not to speak about the quite long rainy seasons.[36] Further, solar cookers ought to be used during daytime to boil all water which is hygienically unsafe.

There are also some emotional aspects accompanying the energy use in households which cannot be overlooked. The African peasant family likes to gather in the evening around the open fire and chat; solar cookers by any evidence cannot satisfy this emotional need.

It follows therefore that the era of the use of firewood in households cannot as yet be over—not at least for the poor living in the traditional sector or in squatter settlements around the cities.

The problem of firewood is first a question of its supply—the respec-

[36] "Although some technologies may appear to be 'appropriate', in the eyes of the technologists and development workers, the people who are expected to use them—the rural women—may not think they are appropriate at all. . . . The technologists seem to have so far proceeded without any due consideration being given to a number of relevant factors such as the needs and wants of the end users of their products. There has thus been a proliferation of solar reflective cookers which can be used to prepare food without firewood, but which also ignore prevailing customs and conditions in the villages. For example, such cookers must be placed directly facing the sun and have, therefore, to be constantly adjusted as the sun moves. An additional disadvantage is that they cannot support a sufficiently large pot to cook a full meal for a large family. Perhaps the most serious objection to these cookers is that the main meal of the day is usually cooked in the evening when the sun has either gone to rest or has lost most of its strength. In addition, village women in many countries are used to cooking indoors and are hostile to the idea of moving their stove into the open—and especially into the direct sunlight." Economic Commission for Africa, ST/ECA/ATRCW/82/10, Annex II, pp. 5–6.

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tive projects, fuelwood plantations, which are emerging have already been mentioned—and then the question of its truly effective use.

The development and spreading on a vast scale of a truly economical stove would constitute a major breakthrough in the energy issue. While the traditional "three stone method" still prevailing in the rural areas uses the energy potential of fuelwood in as little as 5 per cent, an economical stove made of everywhere available clay and grass could use as much as 25 per cent of the energy potential. There is room for improvement of the cooking and heating habits in the households, too; the fireplace would certainly not burn all day, as is frequently the case, if the matches were distributed freely.

3. *The Sources of Soil Degradation*

What is being called antropogenous load on a given environment is of course not to be limited to the impact of human populations only or just to their numbers.

Besides human populations there are livestock populations, too. And just as there can be agricultural overuse of land, there is overgrazing. Southern Europe has provided historical examples how overgrazing of environmentally vulnerable areas can result in widespread soil erosion; the sheep and the goats are said to be responsible for that erosion along with the clearing of trees which were used for shipbuilding.

Unlike wild game, the numbers of which are regulated by the natural laws of the given environment so that an "overpopulation" of different species is virtually impossible, the livestock which accompanies human populations can be increased almost at will—for economic purposes, for reasons of prestige or because having a certain quantity of livestock has been built into the national culture, like in East Africa—until they meet with the carrying capacity of the environment. Especially the overgrazing of mountainous areas has proved to be an ecological hazard. When torrential rains come and the topsoil is not held together by vegetation it will be washed into the rivers and lost forever. This is no more a minor question of a clean environment or of a certain quality of life resulting from a well kept human environment, something that was on the minds of most of those who met in Stockholm in 1972. Soil gone is life destroyed forever.

There is no doubt that soil losses are very severe and the more so if the land is in an ecologically vulnerable zone and if its topography and pattern of rainfalls facilitate erosion.[37] Some concrete figures have also

[37] "Soil loss has accelerated sharply throughout the food-hungry tropics, which are generally more susceptible to erosion than the temperate zone, due to the topography of the land and the nature of the soil and rainfall." *World Conservation Strategy,*

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been given about the extent of soil erosion but they seem to differ widely.[38]

The life-supporting capacity of land in various environments has been expressed in figures. In the semi-arid zones of Africa, and given the type of economic activities prevailing there, the maximum load of human populations has been estimated to be at 20 persons per one square kilometre, and 1 animal per 1 hectare. The carrying capacity of arid zones which are ecologically more vulnerable is of course lower: it lies at 7 humans to 1 km² and 1 animal per 5 hectares.[39]

As a matter of fact there are two possible ways of degradation of soil. One of them is a gradual exhaustion of the suitability of land for agricultural purposes, accompanied by a decline of its fertility, loss of nutrients, or again by increasing salinity or alkalinity, the other consists in an outright loss of topsoil, due to water or wind erosion, and facilitated by previous deforestation, denuding of whole areas through overgrazing or wrong agricultural practices, etc.

The attempts to assess the carrying capacity of the environments most threatened by ecological destabilization in developing countries in

op. cit.—"Although natural resources sustain life, human activities are progressively reducing the natural resources' life supporting capacity. . . . Soil [in Ethiopia] . . . is under a continuous damage. Erosion is accelerated [having been] mostly caused by deforestation, overgrazing and improper agricultural system. . . . Although exact data on soil are not available, more than 50% of the land of the country suffers from severe soil erosion." National Training Workshop in Environmental Education in Ethiopia, *Final Report* (Addis Ababa, 23–26 August 1983), p. 19.

[38]In India, according again to *World Conservation Strategy*, *op. cit.*, "an estimated 6,000 million tonnes of soil are lost every year from 800,000 km² alone; with them go more than 6 million tonnes of nutrients—more than the amount that is applied in the form of fertilizers". According to Worldwatch Institute, "as human pressures on the economy's support systems build . . . the more severely stressed ones are beginning to break down". According to a report prepared as early as 1978 Ethiopia was said to be "losing a billion tonnes of topsoil annually". "Especially Ethiopia's highlands . . . are an ecological disaster. A series of droughts since 1972, combined with man-made acts of deforestation, overgrazing and cultivation of slopes, have degraded the land to such an extent that 240,000 hectares of arable land are being washed away every year." *Development Forum*, Vol, 13, No. 3, April 1985, p. 10.

[39]During the preparatory work for the UN Conference on Desertification it was assumed that the "carrying capacity of the land is its ecological limit in terms of its ability to support a certain human and animal population density. . . . For a domestic animal population, it was further assumed that the biomass production of pasture of a hectare in [arid and semi-arid] zones can support the following equivalents: one bovid—ten sheep or goats—two asses—one horse—one camel. . . . [However], . . . further research is required in order to confirm this assumption." *Combating Desertification in Africa*, Economic Commission for Africa, E/ECA/CM.8/21, 5 April 1982. (Document for the 8th Meeting of the Conference of Ministers, Tripoli, 27–30 April 1982.)

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numerical terms confirms the thesis that in a given environment and with typical economical activities there ought to exist a relationship between a permissible number of humans (plus their livestock) and the capacity of the environment to absorb such a load.

The population issue therefore cannot be obviously left out from environmental considerations. It should be added, however, that individuals, nations and indeed whole cultures can differ fundamentally as regards the actual volume of ecological load, as well as the ecological relevance of such a load.

If, for example, one Swiss, according to the World Conservation Strategy, exerts a 40 times greater impact upon the resources of the environment than his distant neighbour who lives in Somalia, it does not follow that the environment of Switzerland would be exposed to an antropogenous impact so many times greater than that of Somalia. The environment of Somalia happens to be situated, first, in an ecologically highly vulnerable semiarid zone while the Swiss one, even if it is mountainous, is in a moderate zone with sufficient rainfall and low evapotranspiration; and second, the demand of the Swiss for the resources of the environment is supported by a highly productive economy, does not evolve in a linear way being focussed on approximately the same necessities, but is spread to satisfy secondary and tertiary human needs. The strength of the Swiss economy enables it to reach out for the satisfaction of widespread needs to different corners of the world from which the necessary items can be imported.

Because of the decisive role the size of the human and animal populations plays in respect of the environment in the hot zones, one of the priority recommendations which have been formulated after the recent drought catastrophes in Africa was dilute, or to rarify, the population which interacts with the environment. A measure leading to this aim is the resettlement of a part of the population.[40] It is expected that the lower density of population will enable the environment to regenerate and to become stable again, when the antropogenous pressure has been reduced and is kept under permanent control.

[40]Of the 7.9 million people in a country which is said to be "critically affected" by the drought (Ethiopia, see *Development Forum*, April 1985, p. 10), only about a third is planned to be resettled to the more fertile regions of the country from the Northern and North-Eastern areas of Ethiopa most hit by the recent drought: "When the nation's long-term scheme [of resettlement] reaches its climax by 1994, 2.5 to 3 million people will have assumed a new life in new villages." *The Ethiopian Herald*, March 21, 1985.—Ethiopia's "special Programme of Action includes rehabilitating drought victims and carrying out intensive water and soil conservation programmes as well as resettling those drought affected people from areas which are beyond reclamation". (From the opening message of Mengistu Haile Meriam to the 11th Meeting of the Conference of ECA Ministers, *The Ethiopian Herald*, April 26, 1985.)

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4. *Desertification or Desertization?*

The recent years have brought nearer the spectre of desertification in a number of developing countries. The greatest outburst of the respective fears and warnings came in the fall of 1984 with the catastrophic famine and drought in Ethiopia and in a number of other countries of Africa lying in the Sahel zone and in the Kalahari region. Questions of fundamental character started to be asked, whether the drought was just a large-scale but at any rate only a temporary event, or whether it signaled profound changes of the climate and an irreversible advancement of the deserts.

The recent drought which climaxed in 1984 and aroused worldwide attention was, however, not an isolated event. It was preceded, if we are to stay within the African context, by a similar drought at the beginning of the seventies. That drought was rather large-scale, too, even if its intensity was not so pronounced as it was in the case of the recent one. The earlier Sahelian drought lasted from 1968 to 1973. It was responsible for the death of over 150,000 people and millions of cattle and other livestock.[41]

After about five years of relative calm in 1978 another wave of drought came which again hit the Sudano-Sahelian region, the Ogaden peninsula and the South African Kalahari region. In 1983 the situation became even more dramatic, when the evaluation of pictures taken from FAO satellites showed that the green line of vegetation along the Southern ringe of the Sahara has moved 200 km more to the South.

This was of course an exceptional and not a permanent situation caused by an extraordinary spell of drought. Otherwise, however, the Sahara desert is said to be constantly creeping forward at the rate of 7 to 8 km, and according to some estimates even 12 km a year. An ECA document says:

> Deserts in Africa have been encroaching on useful agricultural land at the rate of 60,000 to 70,000 km^2 per year. The creeping desert is choking agricultural land and affecting the livelihood of about 60 million people directly. Globally, about 600–700 million people living in semiarid regions, or about 14 per cent of the world's population, are threatened by drought and desertification every year.[42]

The sudden reappearance of the droughts in critical African regions in the first half of the eighties gave rise to a number of questions. It was observed that in the rainfall pattern of the Sudano-Sahelian region certain unprecedented changes emerged. The so-called "little rains" normally

[41] *Combating Desertification in Africa, op. cit.; Combating the Effects of Cyclical Drought in Ethiopia*, Addis Ababa, Relief and Rehabilitation Commission, January 1985.

[42] *Combating Desertification in Africa, op. cit.*, p. 1.

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expected in February and March and the "main rains" between June and September were erratic in general and gave below-average amounts of rainfall; on the other hand, however, there were also some flash floods. The consequences of this changed rainfall pattern on crops can easily be imagined. It provoked a further basic question whether or not all this meant profound changes of the climate which would not fail to have repercussions on the environment and for human existence as such.

In principle there appear to be two explanations. One of the explanations would say that the droughts have a repetitive, or recurrent feature—or again that their character is permanent, meaning that advancing deserts would not recede any more—but that both possible alternatives have natural causes. The term "desertization" has started to be introduced in this connection meaning that the climatic changes and the subsequent progress of deserts are of secular nature and have nothing to do with human activities.[43]

The other explanation, however, which is associated with the nowadays much more frequented term "desertification" implies that the recurrent droughts, ever more intensive and separated by ever shorter intervals, simply mean that the stress of human, antropogenous activities, which has been increasing, maybe over decades, has reached a point where qualitative changes are visible. These qualitative changes imply a destabilization of the natural environment, a virtual collapse of its regenerative capacities (expressed in the notion of "carrying capacity") and an irrevocable appearance of deserts where earlier used to exist fertile agricultural land capable of feeding millions of people. Expressed in dialectical terms, the gradual increase of hardly observable minor quantitative changes suddenly turned, when a certain critical point was passed, into a qualitatively new condition of a degraded environment, hostile to its former inhabitants.

More than half of African countries have been hit by the current wave of drought by now. It is symptomatic that out of these 27 countries most affected by drought more than a half are so-called least developed countries. The majority of them, namely 13, are situated in the Sudano-Sahelian region and the remaining four are in the region of the other great African desert, Kalahari.[44]

The relationship and, indeed, interaction which may exist between underdevelopment, as reflected in the number of the least developed countries

[43]The already quoted ECA document refers to a study produced by D. Winstanley, a dry-climate theorist who used climatic data checked against diaries and reports of early explorers as far back as 120 years ago where a 25–45 per cent reduction in rainfall in the Sahel is shown. *Combating Desertification in Africa, op. cit.*

[44]Erik Eckholm, "Deserts of Poverty", *Development Forum*, April 1984, p. 8.

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affected by desertification, and the degradation of the environment, is certainly striking and deserves by any means more careful exploration.

A certain guideline can be found in an almost universal consensus that the climatic and environmental changes we are able to witness today in the third world countries, are attributable not to secular process of desertization but rather to man-made desertification. The ECA document concludes:

> The current wave of desertification is too rapid to be attributable to a gradual climatic change. Present indications are that desertification is the encroachment of the desert on arable land in the fragile ecosystems in the desert fringes as a result of land-use mismanagement by human activities.[45]

We shall be able to follow this clue in the following chapter.

IV. Factors of Environmental Degradation in Developing Countries: Summary Conclusions and Outlook

The process of a steadily increasing stress on the natural environment continues in the world today, in the industrialized as well as in developing countries, along with the still increasing number of inhabitants of the planet.

The intensity as well as the forms of this stress, however, differ in respect to regions, countries and their particular conditions. Even if there is a pressure on the environment in the industrialized countries, it should not be forgotten that it happens under conditions of a qualitatively higher level of overall development, with an economic potential capable of achieving a substantially higher efficiency, and in a social milieu which is more receptive to changes, more adaptable as far as the qualities of the human factor are concerned. One additional important aspect should be added: even if the volume of needs of the population demanding their satisfaction is on the increase, it does not mean a production of ever greater quantities of the same items. There is a tendency of dispersion of the demand into immaterial consumption and services along with the upward trend of cultural levels of the population of a developed country.

It may be noted, too, that a developed country generally finds it much easier than the poorer one to procure any missing material items its inhabitants need through imports; the only way out a developing counrty has is to intensify the exploitation of the resources of its own environment if it does not wish to increase its dependence on external aid.

The pressure on the resources of the biosphere in economically developed countries—even if we leave aside the fact that the environment of these countries is usually less vulnerable due to the circumstance that

[45] *Combating Desertfication in Africa, op. cit.*, p. 2.

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they are, as a rule, situated in the moderate climatic zones—is therefore never so crushing and these resources are never exploited in such a unilateral and extrapolative way, as they would be under conditions of backwardness and low productivity constantly being outstripped by high population increases.

While not constituting the primary cause but being rather derived from overall backwardness, low cultural levels and a lack of adaptability of the poorer nation, the demographic factor, forms in this interplay of factors affecting the environment a determinant of key importance.

With just a slight oversimplification it could be stated that just as the biosphere in developing countries is the crucial area most beset by ecological problems, so are poverty and backwardness—cross-bred with a deformed modernization—the key determinants of environmental degradation.

A closer look at the complex of underdevelopment in respect of the state of the environment in developing countries will, however, reveal that a breakdown of this complex into more specific "risk factors" of ecological degradation would be methodically useful as it would allow these factors to emerge in clearer contours.

The relatively high fragility and vulnerability of the natural environment in the hot tropics and subtropics which is caused mainly by the intensity of solar radiation, pattern of rainfalls, quality and structure of soil, character of the vegetation cover and the topography of the country constitutes the primary one, the natural risk factor.

Apart from the natural dispositions—which may be perhaps at least partially modified by the way of development, but usually only with great costs and delays—there are some other "human" or rather socio-economic and cultural factors, which should be studied and weighed in relationship to these natural conditions.

The key role belongs in this respect to the demographic factor and to the ratio of its quantity to the given country's economically important renewable and unrenewable resources; the central lesson of ecology should never be forgotten that the numbers of any species, and the character of its consumption, production and waste creation, should be always in a balanced relationship to the environment with which this species interacts.

A developing country should, of course, rely as much as possible on its own forces in tackling the problems of its environment. One may spot out some characteristics which affect a country's productive potential and in particular its capability to tackle environmental problems. They seem to be invariably associated with the levels of development, or of the relative backwardness of a given country.

Three partial viewpoints, transformed into the respective indices, may

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be proposed to be used in this respect. The first of them will, of course, relate to the overall level and dynamics of economic growth, expressed by its national income per capita. Another one should characterize the productivity, and possibly also the market orientation, of the agriculture of the country (enabling us to see the capacity of the peasants to feed the population of the country and guarantee its "food security" which is a precondition for the liberation of the balance of payments of the country from exorbitant pressures). Finally there should be some information about the relative position of the traditional sector or perhaps for simplification purposes of the subsistence agriculture only, in the economy of the country.

Experience has shown that unfavourable characteristics in these three respects are symptomatic for a developing country beset by problems of the environment. There probably exists some causal relationship, which ought to be explored in greater detail, that in contrast to industrial pollution which affects the most developed countries, the least developed ones register their gravest environmental problems in their biosphere, and that these are predominantly equally man-made as those which plague industrialized nations. In developing countries this causal relationship should be between poverty and backwardness on the one hand, and environmental destabilization on the other hand. At any rate it is interesting to note the close correlation between belonging to the category of the least developed countries, and a degraded ecology. It is easy to persuade oneself about this interdependence by looking simply into the statistical surveys.[46]

Besides the internal risk factors of potential ecological destabilization it is inevitable to take into account also some external factors. These may on the one hand signal the appearance of such a destabilization due to foreign influences (a nation's environment may be affected not only by the so-called transboundary flow of emissions, but equally by such foreign influences like the demonstration effect, or again by a key foreign market

[46] "From the countries "critically affected" by the recent drought in Africa the overwhelming majority are countries which belong into the category of the least developed ones. According to the order of magnitude in which they have been hit by this natural disaster they are: Ethiopia, Sudan, Rwanda, Mozambique, Niger, Chad, Tanzania, Mauritania, Mali, Burkina Faso; further Botswana, Burundi, Cape Verde, Lesotho, Somalia. Relatively the greatest is the proportion of people affected by drought in Mauritania (68.7 per cent) and in Rwanda (54.5 per cent). The consequences of the drought have been projected not only in the economy and the human sufferings in the respective countries, but also in other areas: the number of refugees has grown to millions and some political regimes became shaky and eventually were toppled by public discontent, like Nimeiri's in the Sudan. *Development Forum*, April 1985, p. 10.

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which has become disinterested in the items a developing country was able to export) or they may act as ecological problem-releasers.

One of these risk factors, however much it may seem to be distant from a country's internal ecology, can be characterized as export weakness. This particular trait of a country related of course to underdevelopment has a number of consequences and some of them directly affect the environment. If a country is incapable of earning enough of foreign exchange for settling the development projects' import bill, it may end up as being heavily indebted and crushingly dependent on foreign aid and on foreign capital penetration. A too much increasing external dependence of a poorer country will ultimately mean a subordination of the country, including the resources of its environment to foreign influences and interests.

The other external risk factor which logically results from the preceding one is a tendency of a developing country to pay for the indispensable imports, be it food, or energy, or machinery, by valuable items representing irreplaceable parts of its natural environment, like forests. To regress to exports of scarce natural resources is not only a step backward into the pattern of trade which used to be dictated by foreign monopolies. Under the present circumstances of the world economy this is something which bears witness of a surrender of a county in front of the difficulties it was unable to cope with. The price it will have to pay for this position will most likely be high and affect both its environment and the possibilities of survival.

Finally, there is a specific risk factor which is present in deveolping countries particularly in their traditional sector and which is very probably responsible for most of the damage being done to the environment. It is the cultural factor, however nebulous such a term may at the first glance seem. It should not be viewed as perhaps an insufficient amount of schooling embodied in the labour force. Rather it is a complex of ecologically nefarious traditions, lifestyles and prejudices, projecting themselves into the consumption patterns, technologies employed and the overall world outlook. It is this outlook which pushes the developing countries into the "poverty traps" already mentioned. And it is this outlook what prevents and poor and ignorant masses to readapt their behaviour to the changing ecological conditions. What appeared in one area may reappear elsewhere unless something essential in the cultural factor changes.[47]

[47]The resettlement of peasants from Ethiopia's drought-stricken Northern areas to the climatically better-off South-West was a necessity but has no guaranteed outcome. If the resettled peasants are allowed "to continue with the same farming and cultiva-

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It is just as difficult as it would be useful to link the different but no doubt interdependent risk factors of ecological degradation into a consistent whole and to draw up what could be called a scenario of ecological destabilization. This would probably enable a prediction of problems and their preventive solution, once at least some of the risk factors make their appearance. In Figure 1 it is attempted to have the crucial risk factors as well as their consequences summarized in a simplified way of course, with a view to further research and eventual econometric quantification if possible.

Model Scenario of Environmental Degradation in Developing Countries

Risk factors	*Potential consequences*
STAGE I	
I/1 *Culture*	undaptiveness, failure to "overlearn" quickly
I/2 *Demography*	destabilization of Man-Nature equilibrium
I/3 *Environment in hot climate*	vulnerability to anthropogenous pressures, destabilization of carry ing capacity

Possibility of *active solution* in Stage I: vigorous take-off leading to higher levels of economic performance, modernized production technology and an adoption of environment-benign cultural pattern.

STAGE II

If active solution cannot for whatever reasons take place, Stage II follows where different tools of internal and external economic policy are tried which unfortunately cannot be usually effective due to an overall economic weakness; risk factors which were "dormant" under conditions of relative Man-Nature equilibrium turn into overt risk contributing to environmental degradation:

II/1 *Low national income per capita*	inability to mobilize sufficient resources for investment checking environmental degradation

tion technique in the settled areas as they had been doing in the north it will certainly result in repeating the same grim experience of the north in the west as well." Tamirat Zerihoun, "Desertification, Drought and Famine", *The Ethiopian Herald*, August 4, 1985.

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Risk factors	*Potential consequences*
II/2 *Subsistence agriculture*	inability of the country to feed itself compensating by massive food imports and food aid
II/3 *Predominance of traditional sector*	tradition-bound cultural patterns hostile to environment, deepening of poverty trap
II/4 *Export weakness*	dependence on aid and TNCs, chronical indebtedness
II/5 *Resource depletion through exports*	poverty trap projected into world economy

Possibility of *passive solution*, i.e. accommodation with the *status quo*, appears to emerge in Stage II if the developing country finds its economic tools too weak and accepts external dependence as an inescapable reality, together with underdevelopment.

What concerns the further economic development of a third world country with destabilized natural environment, the most obvious prediction will probably be that the pressure of the moment and the plight of the starving masses will place the solution of serious current problems before the implementation of any long-term development intentions and the respective programmes. These programmes, if not cancelled at all, will probably undergo drastic revisions, first because the country will need all scarce resources and foreign exchange for covering the food gap, and second, because it will appear to potential creditors as a less solvent and prospective commerical partner.

The top priority therefore will not be the implementation of industrialization programmes but the feeding of destitute populations. As development strategies are concerned this order of preferences will probably mean, at least temporarily, goodbye to bold industrialization schemes and a shift towards what is known as the basic needs strategy, which is both needs and people-centered but much less growth-concerned as development strategies used to be in the past few decades.

In a developing country with a destabilized ecology and dim economic development very probably restrictive tendencies will get the upper hand. One, and the most likely consequence, will be the limiting of imports to the bare necessities essential for the economic survival, restrictions on the imports of luxury goods, limits on the imports of machinery and investment goods in a situation when, of course, imports of foodstuffs or of energy must be preferred. If, however, this active policy runs into too many difficulties or if the situation worsens beyond the capacity of the country to control it, an opposite extreme may not be excluded and one may see

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an increase of external dependence, reflected in growing indebtedness, more of foreign aid compensating the missting internal self-reliance and a tacit acceptance of the role of a "client state" whose weakness which originally was ecological and economical would penetrate also into the political and military fields.

As far as the relative weight of the economic sectors is concerned there will very probably be a greater importance attached to agriculture than to industry. The reasons are self-evident and result from the preference for a basic-needs strategy as against the growth- and industrialization-oriented one.

This may, however, also mean that in imports, no matter how limited they will have to be, the preference will be given to everything that can increase agricultural productivity. It would be too much to expect under such circumstances the pursuit of the policy to diversify exports; on the contrary the traditional and monocultural character of exports become ever more pronounced.

The yardstick of ecology has contributed also to a certain reappraisal of the criticism of monocultures, of exports and of the agricultural production in general. The devastating deforestation is an ecological disaster beyond any doubt and needs no further comments. The ecology, however, may be devastated also if the cleared agricultural land is sown each year in order to obtain from it more and more of the much needed food: protection should be taken against soil erosion and the tradition-bound farmers have to be taught soil-conservation methods, irrigation, terracing, contour farming, etc.

Some branches of agricultural production, however, which used to be hotly criticized as symptoms of monocultural production—coffee, to take just one example—are seen now as ecologically quite acceptable because the plants which stay more than one year mean less exhaustion of the soil. This realization can strengthen the tendencies towards traditional monocultures: any departure from an established course is connected with difficulties, besides it is difficult to engage on new roads under stress, and however much these monocultures may destabilize the external economy, the main thing now is that they do not destabilize the ecology as well.

There has been criticism heard recently that, especially in Africa, a change in nutrition habits in the cities has contributed to ecological problems. This is one of the explanations for the obvious dichotomy between the agricultural production of the traditional sector which has become ever more self-contained and less market-oriented, and the nutrition habits of the city-dwellers who became increasingly dependent on the supplies of food from developed countries as the traditional sector had not much to offer them. The demonstration effect and a number of

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other causes have tied the city dwellers economically to foreign bread-baskets more than to what the local peasants would be able to supply them with.[48]

In the context to the world economy a third world country, which already was poverty-stricken and belonged in the majority of cases, into the category of least developed countries, and which is having grave ecological problems now, will probably also continue to lose the image of a self-reliant country capable of controlling its own destinies.

As the necessary aid may be supplied to a country which was hit by problems of ecology rather by the economically developed countries and in particular by those which have food surpluses, the ties with the neighbouring developing countries may be loosened; it is indeed very likely that these neighbours suffer the same or some similar ecological problems.

One is bound to conclude from this fact that many of the earlier intentions to engage the third world countries more in South. South coopera tion, and form integrations or common markets, will revert into the stage of rhetorics. Despite all good intentions, it is the bare economic need what decides about the respective international ties. In all probability therefore the mounting ecological barriers to development in third world countries will work in favour of the rather asymmetric ties between the more affluent North and the hardest hit countries of the South.

[48] "Africa was once able to feed itself. Not on rice or wheat, tomatoes or trout, but on sorghum, yams, cassava, plantains and the capitaine fish from the Niger. Europe introduced new tastes and trading practices, the best known being the conversion of Senegal into a giant peanut patch. Even at independence, most of Africa could earn hard currency from food exports. ... Nigeria now has a regular food imports bill of more than $ 1 billion. There, the oil bonanza was to blame—it was a cause of the rush from the countryside to the towns, a disastrous shift to Western eating standards and a loss of interest in growing food." Denis Herbstein, "Long Drought Worsens Africa's Bleak Prospects", *International Herald Tribune*, April 21–22, 1984.

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JAPAN'S TRADE PATTERN

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Japan's trade pattern has been unbalanced. Actual data prove that Japan's industrial imports are too low and its industrial exports are too high. Japan still lags behind other advanced countries in intra-industry trade. These are explained largely by the scarcity of resources, which has the historical necessity. Other fundamental reasons for the low industrial imports and the lag of intra-industry trade are the lack of similar industrial countries around Japan and the largeness of its homogeneous domestic market. There are also cultural reasons as pointed by Americans. Many trade barriers are non-price. The causes of Japan's low industrial imports are structural, so that they could not be remedied by cyclical domestic demand expansion. Policy change alone would not substantially increase industrial imports into Japan, as implied by Saxonhouse. Japanese life style needs to be changed.

The third black ship is in the offing. The difference from the first and the second is the international environment. The world has never been so interdependent as now. Asian countries are increasingly dependent on Japan, and vice versa. The increasing output elasticity of Japan's industrial imports suggests such interdependence. Japan's trades with developing countries continue to be rather inter-industry (vertical), although intra-industry (horizontal) trade is on the gradual increase. More balanced trade pattern is needed in a zero-sum world community of interdependence. Japanese economy needs to be transformed drastically (Maekaea report). The "one-set" system needs to be remedied. The products that foreigners can produce better and cheaper should be imported, replacing the domestic ones, however painful this might be. Comparatively disadvantaged products should give way to imports.

Imports are the other side of the same coin (foreign trade). U.S. exports and imports grow together, which should be the case in Japan's industrial trade. Japan exports; its imports must also grow similarly. More industrial imports are expected due to high yen and increasing direct investment by Japanese firms. Japanese subsidiaries abroad will help the recipient countries raise industrial output and exports. Japan will be catching up with other advanced countries in intra-industry trade. The output elasticity of its industrial imports may be on the gradual increase. Efforts are required to be made even at the grass-roots level; Japanese mentality needs to be enhanced; the receptivity to foreign ideas, services and goods needs to be improved ("internationalization from within"). More efforts are also needed on the side of foreign producers and marketers eager to sell their goods and services to Japan.

These efforts will enable Japan to have more balanced trade pattern gradually.

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Introduction

So far Japan has faced three black ships. The first (1853) was when Commodore Perry of the United States sailed his black ships to a Japanese port (Uraga) and forced Japan to open its markets. The second (1945) was when General MacArthur of the Allied Forces stepped onto a Japanese airport (Atsugi) and forced Japan to abandon the military strength and other practices which benefited the country. The third (mid-1980s) is now in the offing from the rest of the world. The current black ship is the international pressure on Japan to open its market and import more industrial goods. This demand is coming from both advanced and developing countries.

It is appropriate to consider it historically, analytically, fundamentally and in terms of policy. This paper deals with Japan's Trade Pattern, especially its import pattern.

The purpose of this paper is to attempt to answer the following questions:

(1) Is there any historical reason for the low industrial import ratio of Japan ?

(2) What does a comparative analysis of trade pattern mean to Japan and other countries ? Do actual data support the international complaint that Japan's industrial imports are too low and its industrial exports too high ?

(3) What are the fundamental reasons for the low industrial import ratio and the consequent lack of horizontal trade ?

(4) What measures of industrial policy have been taken so far ? What are the prospects ? Are there any reasonable prospects of increasing industrial imports ?

1. Historical Background

Historically, Japan used to be no different from most of the currently developing countries. Japan had been far behind the then advanced countries, when its market was opened abroad. It was in 1858 that Townsend Harris, Consul General of the United States, signed a treaty of amity and commerce with Japan. Japan then was a typical agricultural country. It did not start industrializing until late in the 19th century. Its trade consisted of the importation of industrial goods in exchange for the exportation of agricultural goods. Following the market opening, foreign goods began flooding the Japanese market. During the six years from 1860 to 1867, the imports increased as much as thirteen times, while the exports increased as little as two and a half times. This caused many bankruptcies of traditional uncompetitive producers. It was impossible for the Government of Japan to continue this type of trade. The need to

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export thus became a principal stimulus of the trade policy. For the Government of Japan there was no other choice than to resort to the policy of processing imported materials into industrial products. Japan was, and is, very scarce in natural resources. Japan had to import most raw materials, while exporting in order to obtain the foreign currency to pay for such imports. Manufacturing was the only means to obtain this balance. This kind of policy of converting imported materials into export products has remained active until today. This is related to one of the factors of the trade friction against Japan.

In its early stages of development, Japan, like many other developing countries, exported primary goods and imported manufactured products. The ratio of industrial to total imports was as high as 92% in the 1870s, which dipped below 50% only in the early 1910s. Among the imported manufactures, a large share was accounted for by such light-industry products as textiles. By the 1909–1919 period, the primary products were decreasing in importance, compared to simple manufactured exports. Textiles' share of total exports increased: 62% (1909), 65% (1914), 70% (1919). The importance of heavy and chemical industries in the import structure had been increasing during the 1870s through 1910s. This was due to the heavy demand for the industrial products needed to realize the rapid industrialization. This had been led by the Government of Japan. The share of intermediate products increased during the last decades of the 19th century and the initial decades of the 20th century. These essential industrial products were still unavailable in Japan, which is similar to some currently developing countries that are eager to promote industrialization rapidly. Beginning in the 1920s, however, the ratio started falling because of the import substitution (the domestic production of the capital equipment and related products thus far imported). Throughout the Russo-Japanese War and World War I, industrialization progressed even further. The mid 1920s (initial years of the Showa era) saw the rapid increase of Japanese steel products, the exports of which often topped its imports.

The leading export-intensive sectors through 1925–1937 remained textiles, ceramics and other miscellaneous manufactures, despite the increased import substitution of chemical, metal and machinery products for exportation. The major export-intensive sectors in 1952 were the same as those in 1925–1937. By 1960, however, several new sectors increased their export share: transportation equipment, electrical machinery, iron and steel, and rubber. Between 1960 and 1970, the new high-technology, more capital-intensive sectors became fully export-oriented. By 1970, the leading export-intensive sectors were transportation equipment, electrical machinery, iron and steel, and rubber.

It thus took Japan a long time to change its trade pattern from the import of manufactured in exchange for agricultural products, to the

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import of raw materials in exchange for industrial goods. Often supported by the MITI (Ministry of International Trade and Industry), Japanese industries required many decades of efforts in order to become internationally competitive.

It has been demonstrated historically that, when Japanese industries first exported, they were uncompetitive by international standards. Their goods had been exported to those developing countries with few competing domestic producers. Developing Asian countries were important, not only as the supplier of raw materials, but also as the demander of Japanese goods, which remains even today. Gradually, export markets shifted to more advanced markets, as Japanese firms decreased costs, used imported materials more sparingly and thus were able to increase productivity. There proved to be a considerable lag between initial production and export competitiveness.

Japan thus has been expanding its exports of manufactures in the world disproportionately, in contrast with its slow increase of industrial imports. This makes a sharp contrast with a horizontal trade structure of West Germany. Japan's trade pattern has been far less horizontal. Japan stays far behind other advanced countries in terms of intra-industry trade. More advanced countries such as the United States suffered from Japan's gaining comparative advantage.

The 1949 Foreign Exchange and Foreign Trade Law gave the MITI the control over foreign exchange allocations for the purchase of imports. The import policy was thus coordinated with its overall goals. Imports of capital goods not domestically available, resource inputs and some foods were given favourable treatment. In 1964 these foreign-exchange controls were ended, yet many items were subjected to quotas, so that protection continued. Such infant industries as computers were protected, whose imports were not liberalized until 1976. Commodity taxes were often designed to favor domestic rather than imported products, by subjecting the latter to higher tax rates. The 1949 Law was replaced by the Foreign Exchange Law of 1980, under which all foreign exchange transactions are permitted unless specifically prohibited. Thus, liberalization of imports and foreign direct investment was largely completed. The liberalizations, however, did not occur until the Japanese companies had developed sufficiently to compete successfully with foreign rivals.

Apart from these economic factors, other factors should be mentioned. The long historical isolation prior to the market opening nurtured a strong community feeling within Japanese people: a sense that all are bound together by common language, common feelings, common experiences, common cultural heritages and well-understood common values and targets. These characteristics understandably result in the long his-

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torical homogeneity of a nation on a distant group of islands. It is distant from the Western world geographically, and so mentally, from neighboring Asian countries. Japan has been an "outlier", according to Balassa (1986). The homogeneity of Japanese society has often meant exclusiveness to foreigners, especially Europeans.

The import-substituting development strategy of Japan has nurtured historically a tendency to produce all inputs domestically among homogeneous workers, defying imported products. This tendency has been accelerated by the historical lack of similarity with neighboring developing countries with which Japan could trade horizontally. It implicitly has prevented heterogeneous ideas and products from being integrated into Japan's economic society. Japan is basically a one-race country. The capacity of the Japanese to accept things alien seems to be restricted inherently. This is something inconceivable in a multi-race country with built-in heterogeneity.

The above is the historical path of development a resource-poor country must follow in order to catch up with advanced countries by industrialization, which may serve as a lesson for presently developing countries, e.g. Republic of Korea, Singapore, etc. The low industrial import ratio of Japan, though conspicuous internationally, has the above historical background.

2. Comparative Analysis

Let us infer the uniqueness of Japan's trade structure by looking at the actual trade data. Tables 1 and 2 show the trade structures of Japan, West Germany, the U.S.A., along with advanced countries, and developing countries. A glance at the SITC first-digit compositions of imports (Table 1) and exports (Table 2) will lead to many interesting observations. The question remains if they can support the international complaint that Japan's industrial imports are too low and its industrial exports too high. The extent to which Japan's trade pattern is horizontal can be judged by looking at the intra-industry trade indicator a la Grubel-Lloyd. Import elasticities will then be analyzed by regressions, which will be useful in assessing structural changes of industrial imports and prospective implications.

2.1 *Composition of Imports and Exports Compared*

Table 1 shows the following:

1. The industrial import ratio (SITC 5, 6, 7, 8) is higher than 50% in West Germany and the U.S.A. This is true for advanced countries and developing countries in general. In Japan it is below 30% in 1984 and may be far too low in non-Japanese eyes. This might give an impression that the Japanese are artificially protecting domestic industry and

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TABLE 1

THE COMPOSITION OF IMPORTS

(Unit : %)

	SITC	1965	1970	1973	1975	1980	1984
Japan	0, 1	18.0	13.6	15.7	15.2	10.5	11.9
	2, 4	39.4	35.4	32.0	20.1	17.7	15.0
	3	19.9	20.7	21.8	44.3	50.1	45.1
	5	5.0	5.3	4.9	3.6	4.2	6.0
	7	8.7	11.3	8.2	6.6	6.0	7.7
	5, 6, 7, 8	22.5	29.8	30.2	19.9	21.0	27.1
West Germany	0, 1	20.9	16.6	16.5	14.0	10.9	10.7
	2, 4	17.3	13.4	11.9	10.6	8.3	7.9
	3	7.8	8.8	11.4	17.7	22.6	20.5
	5	4.8	6.3	6.6	7.0	7.2	8.6
	7	13.2	18.9	17.8	17.6	18.8	22.0
	5, 6, 7, 8	47.8	58.3	58.3	55.1	55.8	58.6
U.S.A.	0, 1	18.8	15.6	13.3	10.2	8.0	6.9
	2, 4	14.8	8.7	7.6	6.2	4.8	3.8
	3	10.4	7.7	11.8	27.2	32.9	18.7
	5	3.7	3.6	3.5	3.8	3.6	4.2
	7	13.8	28.0	30.3	25.0	25.5	36.4
	5, 6, 7, 8	52.7	64.9	64.7	53.7	52.7	68.6
Advanced Countries	0, 1	16.9	13.5	13.5	11.7	9.2	9.6
	2, 4	15.1	11.6	10.9	8.5	7.2	6.6
	3	10.0	9.8	12.0	22.7	27.2	22.6
	5	6.1	6.5	6.7	6.6	7.1	7.8
	7	21.9	27.0	26.7	24.4	23.0	27.1
	5, 6, 7, 8	56.6	63.5	62.5	56.1	55.2	59.9
Developing Countries	0, 1	15.7	12.8	13.4	11.6	10.6	10.3
	2, 4	6.8	6.3	6.6	4.6	5.2	5.0
	3	8.6	7.9	9.3	15.6	18.4	18.4
	5	8.5	8.9	8.9	8.1	8.3	7.8
	7	30.5	33.5	33.3	34.7	31.9	32.0
	5, 6, 7, 8	66.0	69.0	66.6	65.6	63.2	62.7

Sources: OECD, *Statistics of Foreign Trade*, various issues.

SITC 0=food and live animals chiefly for food; SITC 1=beverages and tobacco; SITC 2=crude materials, inedible, except fuels; SITC 3=mineral fuels, lubricants and related materials; SITC 4=animal and vegetable oils, fats and waxes; SITC 5=chemicals and related products; SITC 6=manufactured goods classified chiefly by material; SITC 7=machinery and transport equipment; SITC 8=miscellaneous manufactured articles.

Note: The column sum of each country in each year does not equal to 100% due to the omission of the SITC 9 (commodities and transactions not classified elsewhere in the SITC).

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TABLE 2

THE COMPOSITION OF EXPORTS

(Unit: %)

	SITC	1965	1970	1973	1975	1980	1984
Japan	0, 1	4.1	3.4	2.3	1.4	1.2	0.8
	2, 3, 4	3.3	2.1	2.2	2.0	1.6	1.2
	5	6.5	6.4	5.8	7.0	5.1	4.4
	7	31.3	40.6	49.3	49.2	58.6	66.6
	5, 6, 7, 8	92.1	93.7	94.5	95.4	96.1	97.0
West Germany	0, 1	2.4	3.1	4.0	4.1	4.8	4.9
	2, 3, 4	7.3	5.7	5.3	5.8	6.3	5.8
	5	11.6	12.0	11.8	11.6	12.7	13.7
	7	46.2	46.5	46.7	46.5	44.6	44.9
	5, 6, 7, 8	88.9	89.7	89.4	88.5	87.1	86.9
U.S.A.	0, 1	16.7	11.9	18.4	15.8	14.2	12.9
	2, 3, 4	15.8	15.7	15.3	14.3	15.9	14.9
	5	8.9	9.0	8.2	8.2	10.5	10.6
	7	37.1	42.0	39.7	43.1	38.9	42.7
	5, 6, 7, 8	64.0	69.0	63.7	66.9	67.7	68.2
Advanced Countries	0, 1	13.8	10.8	12.3	11.4	10.3	9.4
	2, 4	10.6	8.8	8.6	6.8	6.6	6.2
	3	3.4	3.4	3.5	5.1	6.9	7.9
	5	8.3	8.7	8.8	9.2	10.2	10.0
	7	30.6	35.1	35.0	36.8	34.7	37.7
	5, 6, 7, 8	70.2	75.8	74.2	75.2	74.6	74.2
Developing Countries	0, 1	28.4	24.1	19.3	14.2	10.1	12.3
	2, 4	22.4	18.2	15.5	9.2	7.1	6.9
	3	31.0	32.9	39.3	59.4	62.2	50.4
	5	1.4	1.7	1.8	1.5	1.7	2.2
	7	1.1	2.6	4.2	3.4	4.9	8.7
	5, 6, 7, 8	17.5	23.7	25.1	16.9	19.8	29.2

Source: OECD, *Statistics of Foreign Trade*.

SITC 0=food and live animals chiefly for food; SITC 1=beverages and tobacco; SITC 2=crude materials, inedible, except fuels; SITC 3=mineral fuels, lubricants and related materials; SITC 4=animal and vegetable oils, fats and waxes; SITC 5=chemicals and related products; SITC 6=manufactured goods classified chiefly by material; SITC 7=machinery and transport equipment; SITC 8=miscellaneous manufactured articles.

Note: The column sum of each country in each year does not equal to 100% due to the omission of the SITC 9 (commodities and transactions not classified elsewhere in the SITC).

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have set up barriers against foreign products. The U.S. market by comparison is so open that high-tech as well as low-tech products are now allowed to penetrate it. This is of course a reflection of the growing supply of technology-intensive goods from NICs and Japan, as well as the U.S. hollowing out (de-industrialization).

2. The import ratio of fuels (SITC 3) is incomparably high in Japan. The same applies to crude materials and animal oils (SITC 2, 4). Together, their combined share amounts to about two-thirds, which no other country or region in Table 1 shows. This means the extreme vulnerability of Japan with respect to natural resources. The import ratio of fuels doubled through the first oil crisis in Japan (from 22% (1973) to 44% (1975)), which is unique to Japan as shown in Table 1. This keeps the industrial import ratio low, although the industrial imports themselves have been rising in absolute terms.

3. The industrial import ratio of Japan has started rising since 1975. It exceeded 30% in 1985. It is said to have temporarily exceeded 40% in 1986; it may dip below 40% again. The 1986 jump is due to such temporary reasons as cheaper petroleum and the temporary use of non-monetary gold. The rise of chemicals and related materials is noticeable.

4. Developing countries (including India) are increasing the supply of light-industry products, which need to be absorbed by advanced markets. It is especially the industrial import ratio of the U.S.A. that has been showing a corresponding rise since 1975. Japan lags behind in this respect, which may justify a LDC complaint of the relatively slow pace of the market opening in Japan.

Table 2 contains the following:

5. Industrial exports constantly amount to about 88% in West Germany and somewhere between 64 and 69% in the U.S.A., with the average of advanced countries lying in between. Extremely high is the industrial export ratio of Japan, which is close to 100% in 1984. Here lies the background of Japan's stormy industrial exports often criticised abroad. Its rise over time is also noteworthy.

6. Also noteworthy is the rise of the industrial export ratio of developing countries including NICs, although it is still below 30% in 1984. These exports are being absorbed by advanced markets, especially the widely open U.S. market, as shown in Table 1.

7. Among the industrial exports from Japan, machinery and transportation (SITC 7) are increasingly dominant (31% (1965), 66% (1984)), although this ratio remains more stable in West Germany, the U.S. and advanced countries in general.

Tables 1 and 2 reveal the following:

8. The excess of the industrial export ratio over the industrial import

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ratio is incomparably great in Japan, amounting to at least 64% (1970) and showing an upward trend. The counterpart in West Germany is at most 66% (1965) and shows a downward trend (28%, 1984). The counterpart in the U.S.A. is always lowest among the three.

9. Common to advanced countries is the constant excess of the industrial export over the industrial import ratio, ranging between 10% and 20%. Exceptional is the U.S.A., with its gap (=export ratio minus import ratio) becoming negative in 2 out of 6 years observed. This suggests an increasing comparative disadvantage on the one hand, and an openness of the U.S. market on the other.

10. Developing countries always show an excess of the import over the export ratio, somewhat inevitable in view of their intended industrialization. This excess, however, has been declining from 50% (1965) to 34% (1984). This reflects the increasing supply of industrial exports of some successful developing countries.

11. Last but not least, these two tables suggest the dominance of inter-, rather than intra-, industry trade pattern of Japan. The intra-industry trade is more frequent among EC countries (including West Germany) and between the U.S. and EC countries. Bergsten and Cline (1983) said, "The trade of Japan with the industrial countries tends to be inter- rather than intra-industry". This statement still holds true, as shown below, and lies behind the international call to increase industrial imports into Japan.

2.2 *Illustrations of Intra-Industry Trade*

The relative lack of intra-industry trade in Japan can be illustrated in terms of the Grubel-Lloyd index. The analysis here uses a trade-weighted Grubel-Lloyd index of intra-industry index (called hereafter GLW), based on the theoretical conclusion of Greenaway and Milner (1983). A higher positive GLW means the more intra-industry trade. They call this a second-best solution to the measurement problem of intra-industry trade. Main 3-digit SITC trade data are derived from U.N., *Commodity Trade Statistics*, Statistical Papers, Series D, various issues.

Diagram 1 illustrates GLWs of Japan compared with the U.S.A. and West Germany. It focuses on the average GLW of those technology-intensive industries which are defined by the UNIDO (1981). The vertical axis shows the value of the GLW (−100% to +100%), whereas the horizontal axis the number of countries trading with the respective countries with their GLWs arranged in ascending order. The total number of countries considered are 224 for Japan, 228 for U.S.A. and 198 for W. Germany. The years are 1981, 1972 and 1963. Only the GLWs of Japan are illustrated for the three years, although the GLWs of the U.S.

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and West Germany already are illustrated elsewhere. For further details see Abe (1987).

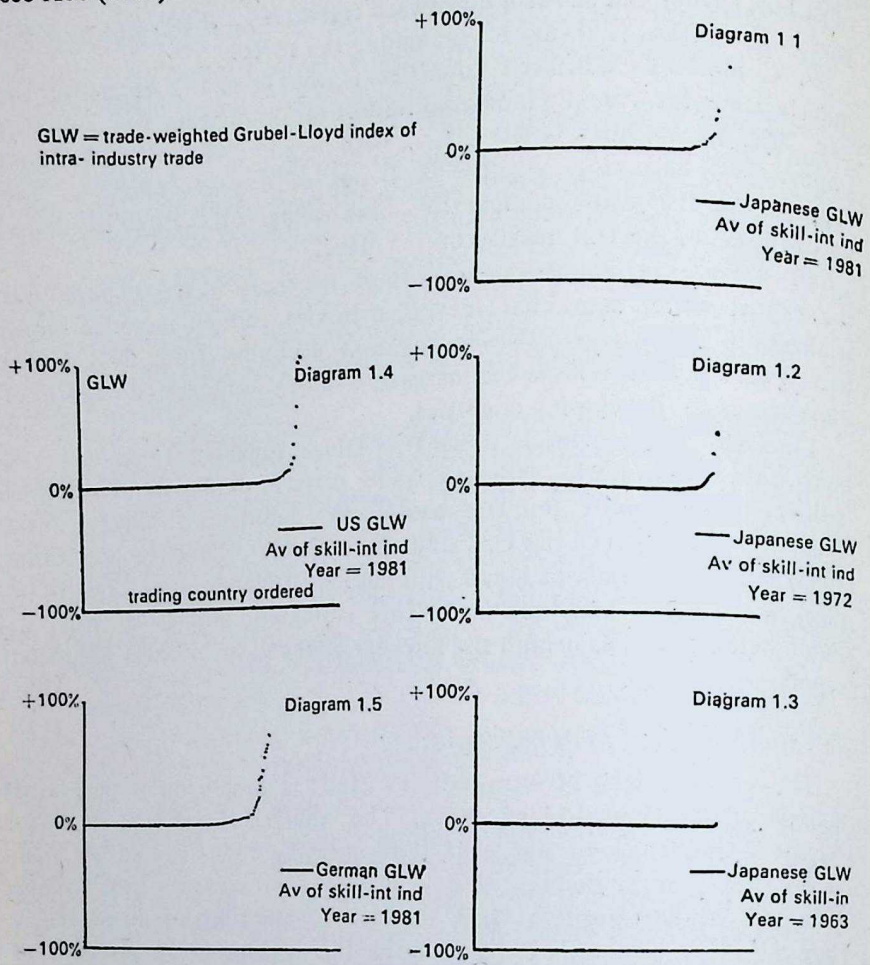

Diagram 1. Illustrated GLWs of the U.S.A., Japan and the FRG (1981, 1972, 1963).

Diagram 1 shows the following:

1. It is in Japan that the number of dots lying above 0% in the north-east direction is smallest in 1981. The intra-industry trade of Japan still lags behind the other two, especially West Germany.

2. The change of the number of such dots, however, is most remarkable in Japan. The patterns of such dots of West Germany and the U.S A. in 1972 and 1963, though omitted here, by contrast, have remained relatively stable.

3. Japan has been catching up with West Germany and the U.S.A. in the intra-industry trade of technology-intensive goods, although the substantial lag lies between them, as shown by Tables 1 and 2.

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2.3 *Change of Import Elasticities in Japan*

The sensitivity of industrial imports to relative prices and industrial activities can be judged by looking at the coefficients of logarithmic regressions. Here, the import elasticities with respect to price and/or output are analyzed for Japan and India. Table 3 gives results for Japan. Table 4, by comparison, shows those of India.

Tables 3 and 4 connote the following:

1. The increase of the coefficient of the log IIP over time means an increasing responsiveness of Japan's industrial imports to domestic production activities. Table 1 has shows that the industrial imports have been rising relatively in Japan. The industrial production has also been rising. The coefficient of the log IIT in Table 3 rose from 1.52 (1966–73) to 2.25 (1974–1983). Behind this lies an increasing competitiveness and complementarity of foreign industrial goods. Some developing countries like Asian NICs have absorbed so many benefits of

TABLE 3

ESTIMATION OF INDUSTRIAL IMPORTS FUNCTIONS OF JAPAN
(Changes of Import Elasticities in Japan)

Independent Variable=log IMP
Dependent Variables=(1) log ((PM*EXR)/WPI)
(2) log IIP
(3) log IMP (−1)
IMP=industrial imports (SITC 5–8)
PM=import price index
WPI=wholesale price index
EXR=exchange rate (yen/$)
IIP=index of industrial production
IMP (−1)=industrial imports lagged one year

Eqn.	Period of estimation	Const.	Dependent variables (1)	(2)	(3)	R^2	DW
1	1966–1973	11.80	−1.52	1.52	−0.16	0.94	2.40
		(2.19)	(−2.31)	(0.99)	(−0.16)		
2	1974–1983	−2.57	−0.13	2.25	0.32	0.95	1.27
		(−1.07)	(−0.56)	(3.18)	(1.58)		
3	1975–1984	−0.79	−0.34	1.69	0.51	0.97	1.57
		(−0.53)	(−1.86)	(3.72)	(3.35)		
4	1966–1984	2.98	−0.52	0.38	0.82	0.98	2.07
		(1.84)	(−2.26)	(1.28)	(9.29)		

Data Sources: Economic Planning Agency (Japan), *Yearbook of National Accounts*, various issues.

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TABLE 4

ESTIMATION OF INDUSTRIAL IMPORTS FUNCTIONS OF INDIA
(Changes of Import Elasticities)

Independent Variable=log INDIMP
Dependent Varibles=(1) log INDIIP
(2) log INDIMP (−1)
INDIMP=India's industrial imports (SITC 5–8)
INDIMP (−1)=India's industrial imports lagged one year

Eqn.	Period of estimation	Const.	Dependent variables (1)	Dependent variables (2)	R^2	DW
1	1966–1973	1.55	0·64	0.55	0.30	1.40
		(0.41)	(1.06)	(1.16)		
2	1974–1983	0.56	0.59	0.69	0.89	1.43
		(−1.07)	(−0.56)	(3.18)		
3	1975–1984	0.53	0.37	0.80	0.90	1.24
		(−0.53)	(−1.86)	(3.72)		
4	1966–1984	−0.40	0.62	0.78	0.96	1.40
		(1.84)	(−2.26)	(1·28)		

Data Sources: United Nations, *Statistical Yearbook for Asia and the Pacific*, various issues; IMF, *International Financial Statistics*, various issues.

backwardness (such as borrowing technology rather than developing it on their own) that they have become increasingly competitive even in this highly competitive Japanese market. The complementarity is the result of Japan's direct investment abroad and the consequent jump of those industrial supplies within the recipient country which can and often must be absorbed by the Japanese market. Japanese subsidiaries report that data from the 1970s show a significant increasing share of sales as their exports to Japan. A series of tariff cuts and import-promoting measures taken by the Government of Japan (see Chapter 4) may also have helped raise the output elasticity. It remains to be seen if the same holds for other goods imported. For most of the imported manufactures the industrial tariff rates are zero, already the lowest in the advanced countries. Preferential tariffs are applied to some industrial imports from developing countries. Import-promotional measures include: the simplification of import procedures, relaxation of import restrictions, improvement of commercial habits and distribution networks, financial help for imports, subsidies to foreign product exhibitions, various import missions, and so on.

The results of India, as shown in Table 4, form a striking contrast to

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those of Japan. The output elasticities of India's industrial imports were decreasing, from 0.64 (1966–1973, before the first oil crisis) to 0.37 (1975–1984, after the first oil crisis). It remains to be seen what was behind. It might be related to the further progress of the import substitution in India's manufacturing and/or some protective policies. The regression equations with price variables failed to meet theoretical expectations and were omitted here.

2. The coefficients of log (PM*EXR)/WPI in Table 3 are negative and fit theoretical consideration. Their absolute values decreased from 1.52 (1966–73) to 0.13 (1974–83). This decrease over time, which might be due to some temporary causes, suggests the increasing importance of non-price factors. It remains to be seen if this is related to any non-tariff barriers. Sophisticated users and consumers of Japan prefer high quality to low quality. They seem to have become more sensitive to quality rather to price. They reduction of industrial tariff rates to zero had not generated the expected jump of imports, suggesting that price cuts alone were not enough to stimulate import demand. Japanese tastes and habits must also be considered. Japanese distribution networks must also be utilized. Successful merchants from abroad pay due respect to these non-price factors and cultural differences. Many trade barriers are non-price.

3. Another reason for the decrease of the price elasticity may be the change of currency system from the fixed to the floating exchange rate system.

4. As indicated by the negative sign of the price elasticity, a higher yen tends to increase industrial imports. The reflection of the higher currency on the domestic price is still narrow and limited in Japan, especially compared with some European countries where the distribution channels are more straight.

3. Fundamental Reasons for the Low Industrial Imports

There are at least three fundamental reasons for the low industrial import ratio of Japan:

1. Japan is without natural resources.
2. Japan has no neighbouring countries with the same or similar developmental stage and with close political ties.
3. Japan has a large and a historically fast growing homogeneous domestic market—now the second largest in the Western world.

Notice that these are interrelated and inherent reasons determined by natural, geographic, political, demographic and cultural conditions. As for # 1, there is a famous law that the bigger the domestic market is, the smaller is the import dependence. The 1984 data from IMF, for example, show that the ratio of total imports to GDP is lower, as the size of the domestic market is higher. Lowest import ratios are registered by such

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big countries as the U.S., Brazil and Japan. Saxonhouse (1983) revealed that the low industrial import ratio of Japan is largely attributable to the scarcity of natural resources. There was not much room for Japan to increase its industrial imports through trade liberalization, which this author supports. Implied here is that policy change alone would not substantially increase Japanese industrial imports.

There is no other country that needs resources like Japan. For the past 100 years, Japan's overwhelming dependence on imports of oil, food, and raw materials has remained unchanged, which makes Japan's position vulnerable in an unstable world economy. This was brought home once again by the oil shock of 1973–1974. Japan is the world's largest importer of non-manufactured goods, without which Japan cannot live. Japan must be a "factory" to process imported raw materials into finished products, which is consumed domestically as well as abroad.

Symbolic of the poverty of Japanese resources is petroleum, its share in total imports being about 1/2 since the oil crisis. Symbolic of the inevitable export orientation of the Japanese economy is the car industry, whose exports have now grown so high as to be roughly equal to the petroleum payments. The proceeds from the car exports roughly match the oil payments from the mid 1980s.

The lack of similar industrial economies in the neighbourhood of Japan (2≠) is said to be a cause of its delay in intra-industry trade as well as its low level of industrial imports. This is especially true, if West Germany, for instance, is compared. The large size of domestic market (≠3, large enough to support the import substitution and the consequent export competitiveness) has enabled Japan to combine various related industrial activities coherently within its boundary. This has resulted in its rather self-sufficient production system that appears exclusive to the outside world. Such a system easily leads to the internationally low ratio of industrial imports. The industrial imports of Japan ($ 27 bill. (1983), $ 30 bill. (1984)) are roughly equivalent to those of Belgium-Luxembourg ($ 30 bill. (1983), $ bill. (1984)). It is true that Belgium-Luxembourg is one-thirteenth of Japan in GNP and one-twelfth in population, but this alone would not be enough to justify the demand for Japan to increase its industrial imports correspondingly. Belgium-Luxembourg has a rational reason for being dependent so much on imports, in view of its domestic size, geographical location and traditional ties with its European neighbours. It is no wonder that Switzerland, about one-tenth of Japan in economic size, has the industrial imports roughly equivalent to Japan.

The Japanese economy is rather self-sufficient in production due to the big all inclusive market (≠3). This means the tendency to produce all goods domestically, defying practically all industrial inputs imported. In Japan this is called a "one-set" system, i.e., a system in which all related

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things are produced together as a set within Japan. A one-set system (full-course production) of car industry, for instance, means that all automobile parts and accessories are made within Japan, depending practically on no foreign inputs, which is inconceivable in some NICs and EC countries. Even the aluminium inputs have been supplied domestically, although they have clear cost disadvantage internationally due to high electricity charges in Japan; the aluminium industry has thus been protected by Japan's industrial policy. Not only is the MITI oriented towards the one set system, Japanese big companies also have been showing such investment behaviours as to incorporate all related subcontract firms under their direct influence. From the angle of foreigners trading with Japan, Japan's industrial and trade structure must appear protected and exclusive. Japan's market of car parts and accessories still remains closed, although Japanese makers attribute this to the lack of quality and the failure to meet the high product standard of Japan by foreign companies.

Developing countries are important for such a resource-poor country as Japan (#1), as the supply source of raw materials and as the market of Japanese goods. Japan's trade with them remains largely vertical or inter-industry. The trade between India and Japan, for instance, is still quite vertical (inter-industry). Japan's exports to India consist mostly of industrial products (87%, 1984), while India'a exports to Japan are made up mostly of raw materials and foods, although the share of processed products recently has been on the increase. Good relations with developing countries are vital to Japan, which cannot be emphasized enough. Problems often arise with developing South and Southeast Asian countries. Japan's presence spread with its search for resources, markets and security. Both Thailand and Indonesia already have seen extensive anti-Japanese rioting. The Japanese were often viewed as selfish and excessively oriented toward exports.

Europeans had little interest in Japan until the late sixties, when exports from Japan became a potentially serious issue. They seemed to have focused on one thing: keeping Japan at bay. Some Europeans said that the Japanese worsened their image by closing their own markets for foreign competition. People abroad are disposed to see events from their own point of view. Most of the world economic tensions were not the fault of Japan alone. Nonetheless, rapid growth, tardy liberalization of imports and capital flows, and burgeoning balance-of-payments surpluses in Japan were catalysts for major changes in the recent world economy as well as the third black ship.

The Japanese, as mentioned earlier, have virtually no natural resources of their own. Their major resource is human: a large educated homogeneous population. Such a big and expanding economy has had the enormous

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appetite for raw materials. For many industrial raw materials, the import ratio stands over 90%. Japan now is the industrial country most dependent on foreign resources, with its mineral resources supplied almost 100% from overseas. The 1982 import ratio of all the iron ore used in Japan, for instance, is as high as 99.7%, its three major suppliers being Australia, Brazil and India. Their continual acquisition and stockpiling is thus a major economic and political problem. Important for Japan is to have good relations with the rest of the world. This requires a change of Japan's fundamental policy as discussed late in the next chapter.

4. Policy Implications

This chapter reviews various political measures taken for opening the Japanese market. This will help the reader know the actual governmental responses, immediate prospects, and the relations to the above fundamental reasons for the low industrial imports.

1. The 1949 Foreign Exchange and Foreign Trade Law gave the MITI (Ministry of International Trade and Industry) the control over foreign-exchange allocations for the purchase of imports. The import policy was thus coordinated with its overall goals. Imports of capital goods not domestically available, resource inputs and some foods were favoured. Imports of raw materials and machinery were restrained only by the availability of foreign exchange. Imports of manufactured consumer goods were forbidden or were subjected to prohibitively high tariffs.

In 1964 these foreign-exchange controls were ended, yet many items were subjected to quotas, so that protection continued. Such infant industries as computers were protected, whose imports were not liberalized until 1976. Commodity taxes were often designed to favour domestic to imported products, by subjecting the latter to higher tax rates. The 1949 Law was replaced by the Foreign Exchange Law of 1980, under which all foreign exchange transactions are permitted unless specifically prohibited. Thus, liberalization of imports and foreign direct investment is largely completed. The liberalizations did not occur until the Japanese companies had developed sufficiently to compete successfully with foreign rivals. The liberalization was thus cautious.

2. The action programs of the Government of Japan to increase industrial imports and decrease trade surpluses in the mid-1980s have indeed led to such stopgap measures as purchases of helicopters, famous paintings, artificial satellites, and so on. These measures were just temporary. They were unable to alter the fundamental one set system of Japan. The traditional distribution system of Japan under international criticism has been partly the cause of the low industrial imports ratio. It is said to be ineffective in distributing the benefits of the stronger yen to final users and consumers sufficiently.

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3. The report submitted in April 1986 to the Prime Minister of Japan by the Advisory Group on Economic Structural Adjustment, the so-called Maekawa report, stated that the present trade imbalance, if continued, would create a critical situation for Japan and the rest of the world. The time has come for a historic transformation of Japan's fundamental economic policies and life style by making the economy less export-oriented. Based on the balanced expansion of the Japanese economy and a parallel increase of imports, the report calls for expansion of domestic demand and increases in consumption spending through income tax cuts. It stressed the need for promoting agricultural policies befitting an age of internationalization with a steady increase in imported products, including agricultural processed products. This report thus emphasized the need for Japan to radically overhaul its economic and industrial structures.

The follow-up to this report, issued in late November 1986, referred for the first time to the hollowing out of Japanese industry caused by the yen's dramatic surge after the Group of Five (G-5) accord in September 1985 characterized by stepped-up Japanese investment abroad. Japan's direct investment, the progress report said, would boost imports into Japan of manufactured products and contribute to the international division of labour. The direct investment would mean the losses of 600,000 jobs between fiscal 1983 and fiscal 2000. The report balanced the need to internationalize Japan with the fact that it accounts for one-tenth of the world's gross national product and is the No. 1 creditor nation. In addition to an expansion of imports, the report urged more frequent use of the yen as an international currency (MDN (Mainichi Daily News), Thurs., April 10, 1986; Wed., Dec. 3, 1986). Chapter 3 already has shown the gradual increase of the output elasticity of industrial imports.

4. The report prepared by the Industrial Structure Council, MITI, said in February 1986 that Japan's industrial structures must be renovated and that industrial products which had lost their competitive edge should give way to imports. The report, entitled "Basic Plan for the 21st Century", bearing on the future trade pattern of Japan, said that promotion of international division of labour, expansion of overseas investment and promotion of technological transfer are indispensable in reducing trade problems. Japan's industry would remain competitive until the year 2000, and the trade surplus would not be reduced drastically even with the continuing rise of the yen against the dollar. The report emphasized the need to strike a balance between trade and domestic economy. It also stressed joint ventures, technological cooperation with trade partners and the replacement of products of less competitive industries with imports. It was implied that textile, chemical, nonferrous metal (including aluminium), ship-building, steel and electric and electronics

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sectors need to adopt more international policies (MDN, Sun., Feb. 2, 1986).

The MITI mapped out a draft bill aimed at transforming Japan's export-oriented economy into one more acceptable to the global community (MDN, Friday, February 6, 1987). It called for launching a large-scale fund to encourage new businesses and new jobs. The yen's sharp advance against the dollar since September 1985 accelerated the industrial restructuring. The new bill said that tax incentives would be created to encourage overseas direct investment and venture capital for risky research and development.

5. The 30th annual post-World War II report (diplomatic blue book) submitted by the Ministry of Foreign Affairs in July 1986 emphasized the need for the third opening of Japan to achieve a socio-economy more harmonious with international economic environment. This would in no way be detrimental to the advantages of its largely homogeneous people. The Meiji Restoration in 1868 marked Japan's first opening to the outside world after decades of feudal rule. The Foreign Ministry called for improving market access, stimulating domestic demand and other steps to promote import expansion which would broaden the choice of Japanese consumers. The report, which was in line with the Maekawa report, stressed the need to turn Japanese economy into one dependent on increased imports and domestic demand. Realizing "a Japan more open to the world", the report said, entails an element of mentality or a receptivity to foreign goods and ideas, or what may be called "internationalization from within". It is important for Japan to actively promote its internationalization and to become a nation more open to the world. Japan's emphasis on becoming full-fledged member of the international community had clearly been stated in the blue book of 1985 that deplored its failure to become an "international state". The annual report reiterated Japan's unfulfilled objective and called upon the Japanese to be "more broad-minded and tolerant as society". On Japan's policy towards fellow Asian countries, the report stressed "people-to-people contacts" and "heart-to-heart contacts" as well as state-to-state relations. (MDN., Wed., July 16, 1986).

6. There seems to be a problem on the side of foreign products and foreign marketers as well. The American Business Conference said that a survey of its 100 member companies showed "cultural preferences" as the most frequently cited hurdle to increase U.S. sales abroad (MDN, Sat., Feb. 7, 1987). It said that, unless American business as a whole makes the necessary investment in quality, service and strategic marketing, it will never become fully competitive in Japan, and that trade barriers do exist, but many are cultural and cannot be reversed by governmental action.

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A successful U.S. marketer in Japan advises other U.S. firms to work within the Japanese system. In his view, Japan's market is not anti-foreign, but just extremely competitive (MDN, Nov. 24, 1985). The keen domestic competition is based on market principles endorsed by both MITI and businessmen.

Of course there is a lot Japan can learn from the U.S.: "A successful export strategy must include open, sensible import policies. U.S. exports and imports grow together. Comparative disadvantage dictates that a nation import goods in some sectors and industries, and reduce barriers to such imports. Restricting imports in one industry also can backfire and hurt industries." (*Twenty-sixth Annual Report of the President of the United States, 1981–82*, p. 7).

A series of measures taken so far to counter the third black ship have produced some results. In a message to an international symposium in Davos, Switzerland, the Prime Minister of Japan said that in quantitative terms Japan's exports declined 1.2% while imports rose 12.5% in 1986. The Government of Japan has taken a series of drastic measures including successive tariff cuts and simplification of import procedures, liberalization of commodity markets and financial markets (MDN, Thursday, February 5, 1987).

5. Conclusion

Japan's trade pattern has been unbalanced. Actual data prove that Japan's industrial imports are too low and its industrial exports are too high. Japan still lags behind other advanced countries in intra-industry trade. These are explained largely by the scarcity of resources, which has the historical necessity. Other fundamental reasons for the low industrial imports and the lag of intra-industry trade are the lack of similar industrial countries around Japan and the largeness of its homogeneous domestic market. There are also cultural reasons as pointed by Americans. Many trade barriers are non-price. The causes of Japan's low industrial imports are structural, so that they could not be remedied by cyclical domestic demand expansion. Policy change alone would not substantially increase industrial imports into Japan, as implied by Saxonhouse. Japanese life style needs to be changed.

The third black ship is in the offing. The difference from the first and the second is the international environment. The world has never been so interdependent as now. Asian countries are increasingly dependent on Japan, and vice versa. The increasing output elasticity of Japan's industrial imports suggests such interdependence. Japan's trades with developing countries continue to be rather inter-industry (vertical), although intra-industry (horizontal) trade is on the gradual increase. More balanced trade pattern is needed in a zero-sum world community of interdependence.

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Japanese economy needs to be transformed drastically (Maekaea report). The "one-set" system needs to be remedied. The products that foreigners can produce better and cheaper should be imported, replacing the domestic ones, however painful this might be. Comparatively disadvantaged products should give way to imports.

Imports are the other side of the same coin (foreign trade). U.S. exports and imports grow together, which should be the case in Japan's industrial trade. Japan exports; its imports must also grow similarly. More industrial imports are expected due to high yen and increasing direct investment by Japanese firms Japanese subsidiaries abroad will help the recipient countries raise industrial output and exports. Japan will be catching up with other advanced countries in intra-industry trade. The output elasticity of its industrial imports may be on the gradual increase. Efforts are required to be made even at the grass-roots level; Japanese mentality needs to be enhanced; the receptivity to foreign ideas, services and goods needs to be improved ("internationalization from within"). More efforts are also needed on the side of foreign producers and marketers eager to sell their goods and services to Japan.

These efforts will enable Japan to have more balanced trade pattern gradually.

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ECONOMY AND GEOGRAPHY IN KARNATAKA: SPATIAL PATTERNS OF DEVELOPMENT

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Political behaviour, the allocation of public benefits, and social programming interact with or take place alongside patterns of economic development. The geography of a state—its resources, climate and physical attributes—is an arena for social, political, and economic action; and in turn that geography is affected by man's agriculture, industrial production, technologies, infrastructure and demographies. Karnataka's economic development in the 1960s and 1970s must thus be assessed as one of a number of processes occurring in a particular spatial context. We will here be concerned mainly with the economic and geographical realms, with some overlap into the social and demographic spheres. We leave to other contributors the tasks of describing and assessing the political currents of the state over the last few decades but have sought to provide a sufficiently broad-ranging and open-ended introduction to the physical and material aspects of Karnataka so that there are evident and derivable linkages and consistencies between their essays and this. Three sections follow : I. An Overview of Economy and Geography, II. A Multivariate Analysis of the Development Process, and III. Conclusion and Future Directions.

I

It would be easy to become enthusiastic about Karnataka's geography and economic resources, or even to wax poetic about its splendid mixture and plain and mountain, seacoast and forest, and agriculture and industry. Visualized as a separate nation the Kannada-speaking people, with the leavening mixture of Tamils, Malayalis and Hindi-speakers of Bangalore and elsewhere, are well situated if not blessed by nature. The climate is attractive. There are some important ore deposits but no huge mineral or petroleum windfalls to create skewed income shares and make neighbours jealous. Extremes of type and welfare range from Bidar

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district in the north with its dry agriculture centred on jowar to Coorg (now Kodagu) in the south with its lucrative multifarious plantations of coffee, fruits, pepper and other spices; and from afforested and hilly North Kanara (now Uttara Kannada), saturated with rain and committed thereby to rice, on the west, to tank-watered, ragi-growing Kolar, with its innards of gold, on the east. In the midst of the south sits Bangalore, a great and almost purely modern Indian city, home of electronic, aeronautical and other major industries and of colleges and research institutes of national and international importance.

What dampens enthusiasm and quashes poetic impulse is, as is so often the case, a recognition of some hard facts. The average income per capita in the 1970s and early 1980s appears to be some ten to twenty per cent below the national average. In 1971, Karnataka's population was 29.3 million, up from 19.4 million in 1951. In 1981 the total was over 37 million. The literacy rate was something over 38 per cent but was only about 28 per cent for women. Unemployment is difficult to define in the Indian context but it is clear that people in rural areas and urban fringes do not have enough work. Productivity is low for most agricultural workers and for people in urban services, transport and menial, sporadic tasks. The most careful management of natural resources, human resources, and the state and central development budgets is required to do more than tread water insofar as these linked problems of poverty, underemployment and low productivity are concerned. Even the immediate setting of the population brake will have little impact because of the inbuilt momentum of today's young population who have still to pass through childbearing years. The large proportion of dependents draws public and private resources for education, health, housing and transport services while yielding little immediate productive income or public revenue.

Whatever the balance one strikes between one's enthusiasm and caution the central conclusion that emerges is that Karnataka's economy, when looked at spatially, has a considerable diversification. The spread of agricultural, mineral, industrial, and service activities, the latter including banking, commerce and public sector functions such as schooling, medical care, or irrigation, is quite complex. There are some major conjunctions of activities but there are also areas where marginal subsistence farming of jowar or ragi is the mainstay, minerals are scarce, and industry on any modern scale is unknown. There is thus concern in the planning process to try to ensure a more even diffusion of economic opportunities via a strategy of making the most of what mineral, water, and human resources are present. Recent five-year plans for the state have stressed the need for area-specific programs as a means of com-

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bating tendencies towards regional disparities.[1] The diversity of the state economy is not at this point inherently spread evenly or fairly enough to satisfy political decision-makers. There is thus a certain tension across regions since more favoured areas where activities cluster must be discriminated against in favour of areas where immediate overt rate of return is lower. Since social divisions as between Lingayat-Okkaliga are clean caste-untouchable also have regional bases and since these large groups and others are important constituencies and interests to which attention must be paid, there are rather evident lines of interplay among the social, political, economic and territorial spheres.[2]

Geographies of India and Karnataka are common enough so that a consensus may be said to have emerged about the general geographic contours of the state. Spate *et al.*, Singh *et al.*, and Misra are useful introductions.[3] The advent of district and regional planning, as well as the introduction

[1]Government of Karnataka, Planning Department, *Fourth Five Year Plan (1969–74)*; *idem*, *Fifth Five Year Plan (1974–79)*; *idem*, *Draft Five Year Plan 1978–83*; there is extensive regional analysis in Ch. IV, *Draft Sixth Five Year Plan, 1980–85*, pp. 65–89.

[2]James Manor, "Pragmatic Progressives in Regional Politics: The Case of Devaraj Urs", *Economic and Political Weekly*, XV, nos. 5, 6 and 7, Annual Number, February 1980, pp. 201–213; Glynn Wood and Robert Hammond, "Electoral Politics in a Congress-Dominant State, Mysore: 1956–1972", in Myron Weiner and John Osgood Field, eds., *Electoral Politics in the Indian States, Party Systems and Cleavages, Vol. IV, Studies in Electoral Politics in the Indian States* (Delhi: Manohar Book Service, 1975), pp. 143–160.

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of spatiality to the state planning documents, have motivated a plethora of analytical-cum-prescriptive publications.[4] In addition there is a new series of district gazeteers and a massive two volume work by Puttaswamiah, *Economic Development of Karnataka*.[5] The cumulative scope of these sources makes easy the tasks of forming general image of the state and its resources and potentials and of delving more deeply into the particular configurations of any given region or district.

Most authorities recognize four broad regions: the narrow coastal belt, the upland Malnad, the northern Maidan, and the southern Maidan. The coastal plain is narrow and low-lying. There is much rain. Paddy is commonly grown. Coconut and casuarina are features of the landscape. The Malnad embraces the hilly western spine of the Western Ghats, which are low in the north but rise upwards of 2,000 metres in the south. The hills are mostly afforested and the region is not intensively farmed. Although the Malnad is a comparatively untouched area the terrain limits transport and the formation of large towns, so its developmental prospects are perhaps less sanguine than often thought. The Ghats screen the interior from rain-bearing winds so that rainfall on the east drops to forty per cent of that on the western slopes. A number of short rivers flow vigorously to the ocean and present opportunities for hydro-electric development, an important asset in what is otherwise an energy-poor state. The north Maidan is a high plateau featuring black soils and some mineral wealth in the form of major iron and manganese deposits. Cotton and jowar are dryfarmed with uneven success. The south Maidan has red soils and at times choppy relief, including some striking isolated hills. Ragi is the chief crop except in areas such as Mandya, Kolar or Mysore where there is considerable tank and canal irrigation.

The urban and industrial centres of the state are headed by Bangalore, Hubli-Dharwar, Mysore and Mangalore. These are each quite distinctive in the roles they play in the economic life of Karnataka. Bangalore now has a population of over 2.91 million. As the seat of State Government and locus of central agencies it adds public sector impetus to a collection of large-scale industries. These include such enterprises as Hindustan Machine Tools and Bharat Electronics, the Government Soap Factory exploiting the state's aromatic sandalwood, and many

[4]For example, see V. K. R. V. Rao, ed., *Planning in Perspective, Policy Choices in Planning for Karnataka, 1973–74 to 1988–89* (Bombay: Allied Publishers for the Institute for Social and Economic Change, 1978); Lalik K. Sen *et al.*, *Growth Centres in Raichur, An Integrated Area Development Plan for a District in Karnataka* (Hyderabad: National Institute of Community Development, 1975).

[5]K. Puttaswamaiah, *Economic Development of Karnataka, Vols. I and II* (New Delhi: Oxford University Press and India Book House Publishing, 1980). Puttaswamaiah edited a number of new gazetteers.

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private firms. Hubli-Dharwar is a twin city serving as a collection and processing point for the cotton districts. Its population is about half a million. Mysore is the old princely seat and has a lingering charm. It has acquired a varied industrial base including paper and textile mills, aggarbatti, match and silk factories, and motor and mechanical works. The state's major port, Mangalore, has something over 300,000 persons and features a mixed commercial and industrial workforce. There are solid universities and colleges in all of these urban centres. Other cities in the state have less complexity than these four and normally have a narrower agricultural or industrial base centred on textiles, iron and steel, or crop marketing.

The road and rail network of the state is not a particular stimulus to rapid growth. The principal road artery slices the state from south-east to north-west along the Madras-Bombay axis and intercepts Bangalore and Hubli-Dharwar. Links to the coast across the ghats are not satisfactory although the ports of Mangalore and Karwar in the north are improving; the latter is an outlet for the interior minerals. The rail system initiated under the Maharajas is meter gauge and thus not compatible with the national broad gauge. Much of agriculture depends on the continued exploitation of irrigation potentials. Three major river systems cross the state from west to east: the Krishna in the north, the Tungabhadra in the centre, and the Cauvery in the south. Numerous irrigation projects are in place including the pre-independence Krishnarajasagar scheme on the Cauvery and the important Tungabhadra system on the river of the same name.

II

A descriptive overview of Karnataka's economic structure and development is undeniably valuable but has certain limitations. Relationships among key geographical, economic, and social variables are not clearly spelled out and quantified. Furthermore, the mind cannot easily absorb the welter of associations that appears when looking at the state spatially. Questions naturally arise, such as: How are irrigation, cropping patterns and possibly urban or infrastructural characteristics connected? Do social patterns such as family size, literacy or female schooling relate to geographical and economic features? Information on a number of these variables and indexes is available in official sources such as the state statistical abstracts or other compendia, the national census reports, and in planning studies. It is thus desirable and feasible to undertake a systematic analysis of patterns of association among representative key indicators. There are a number of multivariate techniques for studying the clustering of geographic, economic and social traits. A relatively simple method of choice is factor analysis, which will be used here to

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examine some important feature of Karnataka's structural or developmental patterns.[6]

Four broad topical areas may be chosen to govern the analysis of some 40 variables that are available for Karnataka's nineteen districts. These are: (1) the basic features of the state and their interrelationships, specifically rainfall, cropping patterns, livestock habits, infrastructure and urban populations; (2) the character of urban development and its relation, if any, to such social phenomena as labour force structure, household size, the dependency ratio, and literacy; (3) the agrarian structure of the state, with emphasis on the utilization of technologies such as tractors, pumps, and the complex of methods associated with high-yielding varieties and fertilizer, and (4) determinants of the rate of agricultural growth in the prior decade (roughly 1962–1971), considering that growth is a principal, if not as the principal, determinant and product of the rural development process. For simplicity these four sets of relations may be called the geographical pattern, the urban-social pattern, agrarian structure, and the agricultural growth process. Each of these areas will be examined in turn by utilizing somewhat overlapping sets of thirteen to sixteen variables pertaining to the nineteen districts which comprise the sample on which the empirical research is based. The total set of 40 variables used in the four studies is listed and described in an appendix which should be consulted as necessary.

The geographical pattern is generated by examining relationships among sixteen indicators that cover a range of economic and geographical features of districts. Table 1 presents the results of a factor analysis of these measures. (A factor analysis clusters variables on the basis of the closeness of their co-variation; features that are typically found together are associated in components or factors that are taken to represent underlying or unifying dimensions.)[7] There are four factors delineated in Table 1 and the analysis makes evident some of the principal features of the state. (The numbers in the factor matrix are called "factor loadings" and may be regarded as correlation coefficients between the underlying factors and the individual variables). F_1, the first factor, shows that areas of the state with higher rainfall focus on rice cultivation; drier regions of the state feature more goats and bullock carts and do not grow rice. Furthermore, the wetter areas have low shares of cultivable land (net area sown) while the dry areas use a larger share of their land in agriculture but less intensively. Literacy is a major social marker identified with the high

[6]Harry H. Harman, *Modern Factor Analysis* (Chicago: University of Chicago Press, 1967)

[7]There are no particular objective criteria for designating such underlying or composite traits. Ordinarily, however, one or two key variables or a rather clear process previously discussed in theoretical literature can be used to type or name the factors.

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TABLE 1

GEOGRAPHICAL PATTERN

Variables	Factors			
	F_1	F_2	F_3	F_4
Rainfall	.951	−.028	−.029	.147
Rice	.813	−.061	−.029	.472
Total literacy	.660	−.120	.418	.091
Goats	−.879	−.270	.227	.005
Net area sown/Area	−.744	.486	.042	−.384
Carts	−.797	−.039	.075	.207
Agr. labour/Cultivators	.072	.885	−.019	−.153
Ragi	−.289	−.799	.482	.043
Cotton	−.391	.683	−.088	−.159
Cattle	.024	−.597	.550	.357
Net area sown/Agr. labour force	−.302	.588	−.287	−.506
Population density	−.193	−.289	.891	.103
Urban population	−.109	.025	.848	−.063
V Plan index	.312	−.179	.822	.441
Irrigated area/Net area sown	.240	−.244	.192	.920
Roads	−.197	−.428	.016	.463
Cumulative variance explained (%)	32	42	68	82

Note: Method applied in all tables was maximum likelihood with varimax rotation.

rainfall, rice-growing regions. In short, F_1 demarcates the West-East dichotomy of the state and particularly captures some of the salient features of the coastal and western ghat districts.

The well-known division of the state, the North-South contrast, is registered by F_2. In F_2 the chief crop indicator is cotton, grown in the north in black Deccan soils. The northern cotton area has two distinctive agrarian features: the ratio of agricultural labourers to cultivators is high as is the ratio of net area sown to agricultural workers (cultivators plus agricultural workers). There is thus the implication that relatively small numbers of northern cultivators control larger amounts of land on which agricultural workers are employed in the production of a cash crop, cotton. This set of relationships suggests a high degree of uncertainty for the agricultural workers in particular since their fortunes will depend precariously on both the vagaries of rainfall and the price of cotton. Jowar is a major food crop in the northern areas although a variable for

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this important (in terms of cultivated area and diet) grain was omitted from the analysis because of the need for parsimony.[8] The negative sign for ragi implies that it is a southern crop. Cattle are also more prominent in the south. The southern area has a lower percentage of agricultural labourers in the agricultural labour force and less arable land per farm worker. One can determine from these contrasts that the northern cotton-jowar and the southern ragi zones have quite different rural structures that merit deeper analysis and mandate different agricultural policy measures. None of these crops—cotton, ragi, jowar—is yet approachable by high yielding methods and this does not bode well for the prosperity of the farmers and particularly the uneasily placed agricultural workers of the two regions.

Following convention, variables have been assigned to F_1, the West-East division and F_2, the North-South dichotomy, on the basis of their highest factor loadings. Since variables may also respond to other factor dimensions the possibility of secondary loadings exists. In factor two there are two variables that merit attention on this basis. The cotton area shows a high ratio of cultivable land to total area in contrast to the other parts of the state but is poorly served by roads; both these coefficients exceed .400 in absolute value.

The third factor, F_3, represents an urban dimension, containing as it does measures of population density, urban population share, and the Fifth Five Year Plan's development index, which embodies an urban component. There are secondary loadings for literacy, ragi cultivation, and cattle abundance. Ragi cultivation and a high for the state in cattle density are traits of Bangalore district which is by and large margin the urban center of the state. Note, however, that literacy rates are not a definitely urban characteristic. Literacy loads preeminently with F_1 which places higher than average rates of literacy in the coastal and other western regions. The large number of cattle near Bangalore city may be guessed to be associated with dairying and with the use of animals for cartage. It is perhaps an important comment that the differentiation of the state represented in F_1, F_2 and F_3 places greater stress on agricultural, climatic and underlying topographical and soil characteristics than on urbanization. Urban and agricultural characteristics are examined in more depth in three subsequent analyses.

Infrastructural development, as represented by road density and the fraction of arable land that is irrigated, does not diverge along the

[8]It is necessary to use fewer variables in any analysis than one has cases. Ideally there should be twice or more as many cases but in working with a total finite population of a state's districts it is necessary to push this rule of thumb. Although jowar occupies more hectarage than any other crop it is closely affiliated with the cotton areas and including both is thus redundant.

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West-East or North-South axes, although specific districts do have sharply different irrigation sources. Mandya district depends heavily on canals, as does Raichur. Kolar, Hassan, Bangalore, Shimoga and Tumkur districts rely principally on tanks while Bijapur, Belgaum, and again Kolar have large numbers of wells; what irrigation there is in S. Kanara and Bidar, quite distinctive wet and dry districts, is also by wells.

Table 2 looks at the relationships of Table 1 in a different fashion. It is possible to assign each district a factor score based on its degree of conformity to the pattern of correlations in a factor. A district with much rainfall, a rice-dominated agriculture, high literacy rates, but few goats, few carts, and a low percentage of arable land would rank highly on F_1. Such is the case for N. Kanara, S. Kanara and Coorg which contrast with Mandya, Bijapur, Kolar, and other interior districts. Similarly the scores on F_2 provide clusters of northern districts such as Dharwar, Bijapur and Raichur and of southern districts such as Hassan, Tumkur, Kolar and Bangalore. The urban dimension naturally finds Bangalore as an extreme case, followed by S. Kanara, Dharwar and Mysore. There are interesting facets of Karnataka's urban development because of the lack of conjunction between literacy measures and urban population and certain other anomalous features.

Overall the factor loadings of Table 1 and the factor scores of Table 2 confirm the conventional contours of the geography of the state and the distribution of economic and social characteristics. Except for the identification of an urban dimension, however, the pattern is essentially a static one. This image of Karnataka, split between the coast of Malnad on the west and interior Deccan on the east and between the cotton tracts of the north and the ragi belt of the south is a long-evident one. That these patterns are in turn related to caste and political factions in the political arena is also well-known.[9] The variety of the state clearly compels skill and compromise in governance and in setting economic development policy. Considerable tailoring to a variety of economic bases and political constituencies must inevitably be a hallmark of successful Karnataka politicians.

In order to probe more deeply into urban and rural developmental patterns and to move away from just-described structural divisions of Karnataka it is necessary to explore new sets of variables appropriate to each subject. Results of this *urban-social* exercise are found in Table 3.

Table 3 utilizes sixteen variables of which only four are carried over from Table 1. (Again, these indicators are described in full in the Appendix). The aim in this analysis is to isolate the most instrumental urban characteristics and to discover the degree to which they define a consis-

[9]Manor, Wood and Hammond, *op. cit.*

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TABLE 2
GEOGRAPHICAL PATTERN: FACTOR SCORES

F_1 West-East		F_2 North-South		F_3 Urban Development		F_4 Irrigation	
N. Kanara	2.05	Dharwar	1.41	Bangalore	3.45	Shimoga	2.74
S. Kanara	2.00	Bijapur	1.21	S. Kanara	1.50	Mandya	1.71
Coorg	1.92	Raichur	1.18	Dharwar	.53	S. Kanara	1.43
Chickmagalur	.74	S. Kanara	1.00	Mysore	.34	Kolar	.73
Shimoga	.27	Bellary	.95	Kolar	.05	Chitradurga	.04
Bidar	.10	Gulbarga	.84	Belgaum	−.12	Raichur	.03
Mysore	.10	Bidar	.59	Bellary	−.20	N. Kanara	−·03
Hassan	−.24	Belgaum	.57	Coorg	−.22	Belgaum	−.10
Bangalore	−.28	Shimoga	.29	Chitradurga	−.22	Mysore	−.10
Chitradurga	−.31	Coorg	.03	Bijapur	−.24	Bellary	−.30
Gulbarga	−.40	Chitradurga	−.11	Bidar	−.29	Chickmagalur	−.40
Bellary	−.48	N. Kanara	−.46	Mandya	−.32	Tumkur	−.43
Dharwar	−.55	Mysore	−.63	Shimoga	−.38	Bijapur	−.47
Tumkur	−.59	Mandya	−.81	Raichur	−.41	Dharwar	−.50
Raichur	−.62	Chickmagalur	−.86	Gulbarga	−.48	Hassan	−.62
Belgaum	−.64	Bangalore	−1.01	Hassan	−.52	Bangalore	−·70
Kolar	−.67	Kolar	−1.17	Tumkur	−.59	Gulbarga	−.86
Bijapur	−.98	Tumkur	−1.34	Chickmagalur	−·86	Bidar	−1.00
Mandya	−1.26	Hassan	−1.68	N. Kanara	−1.05	Coorg	−1.17

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TABLE 3

URBAN-SOCIAL PATTERN

Variables	Factors			
	F_1	F_2	F_3	F_4
Urban population	.961	−.141	−.089	.054
Manuf. const. labour force	.922	.210	−.108	.113
Commerce labour force	.915	.345	.034	.038
Radios	.842	.223	−.379	.136
Population density	.776	−.155	−.084	.075
Long-run population growth	.728	−.147	−.031	−.005
Farm labour force	−.683	−.319	−.080	−.652
Rainfall	−.079	.932	−.315	.130
Banks	.260	.817	−.436	−.112
Female literacy	.413	.630	−.625	.038
Scheduled castes	−.049	−.562	.050	−.026
School sex ratio	−.251	−.119	.940	−.198
Dependency ratio	.004	−.027	−.069	.690
Household size	.070	.105	−.008	.414
Urban growth 61–71	.090	−.349	−.086	−.180
Sex ratio change	−.090	.195	−.295	−.206
Cumulative variance explained (%)	32	41	56	70

tent urban dimension. It is convenient in this context to utilize a number of social indicators, such as female literacy, the distribution of scheduled castes and long-run population growth, since many of these are conventionally putatively associated with advancing urbanization. In general the goal is thus to identify a strong urban dimension and to determine whether a collection of social variables is acting in concert with or contrary to that dimension. Suffice it to say by way of introduction that the results are surprisingly complex and that the perversity of several social indicators is outstanding.

The first factor successfully represents a distinctive urbanism dimension in Karnataka. The signal variable is the proportionate importance of the urban population of a district. Three labour force indicators also define urbanism: the share of the labor force in manufacturing and construction, the share of the labour force in trade and commerce, and with a negative sign share of the labour force in agriculture. Representing the higher level of communication networks in cities is radios per person; similar results would obtain for newspaper readership or postal circulation. Two demographic measures adhere to F_1. These are long-run population growth over the *1901–1971* period and population density. While urban concentrations, long-run population growth as a product of natural increase and inward migration, and population density would

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seem to be inevitable fellow travellers, this is not necessarily so in India where rural population densities may be quite high. Rice areas, such as those in nearby Tamil Nadu, may display these "urban" characteristics.[10]

Certain typically urban parameters are not found F_1. The leading example here is perhaps female literacy which has only a weak secondary loading. The number of banks per capita would normally be expected to serve as a measure of urbanization since financial services are associated with the industrial and commercial activities centred in cities. Yet, in Karnataka this pattern does not hold. Similarly the school sex ratio (males and females) is not appreciably lower in urbanized areas although the factor loading (−.251) does display the correct sign. Several social variables—scheduled castes, the dependency ratio, household size, urban growth (1961–71), and change in the sex ratio of the population (1961–71) —are not associated with varying levels of urbanism. This is somewhat surprising since relations of family structure, for example, and urban residency and modern employment have been much investigated in India.

In this urban-social analysis the rank according to factor scores of the districts does not highlight any curiosities and generally confirms expected orderings. On F_1 the top six districts are Bangalore, Dharwar, S. Kanara, Mysore, Shimoga and Bellary. These are located mostly in the south central portion of the state, leaving the northern salient of Bidar, Gulbarga, Bijapur and Raichur without a strong urban focal point. Nonethe-less, the Dharwar-Hubli complex is a dynamic centre standing independently of Bangalore in north-central Karnataka.

The second factor in the urban analysis indicates a strong affinity among high rainfall, banking services, female literacy, and a dearth of scheduled caste members. As in the case of F_1 in the geographical pattern the strong differences between the coastal districts, exemplified best in the Kanaras and Coorg, register starkly. A matter of special interest is that the historical development of a lively banking community on the west coast and a long commitment to female and general education, are salient features of a not heavily urbanized region of India. Leadership and social development can sway important dimensions of life and welfare even in places not bludgeoned into modernity by the forges of industry and the inescapable pressures of urban living.[11]

The social indicators attract attention because of their failure to

[10]John Adams, "Urbanization in Southern India: A Developmental Analysis", paper presented at Southeast Conference, Association for Asian Studies, Lexington, Virginia, January 1981.

[11]The western coast shares traits associated with Kerala and Sri Lanka, which are increasingly recognized as following a special development path contrasting with those of the Punjab or Bengal-Bangladesh. See Thomas Timberg, "Regions in Indian Development", *Pacific Affairs*, 53 (Winter, 1980–81), pp, 643–650.

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behave in concert with strong urban features and the West-East differentiation of F_2. None of the social measures that form the final seven rows of Table 3 loads in the urban factor. The highest factor loading is —.251 for the school sex ratio; the others are totally without import. Female literacy is greatest in the west, as noted, but is somewhat higher in more urban districts. Not unexpectedly the female literacy rate is low where fewer females in proportion to males are in schools, as indicated by the opposite signs for these variables in F_3. Looked at as a factor, F_3 offers a weak suggestion of a social modernity or progressive outlook scale. Associated are high rates of radio use, banking services, and female literacy, in addition to more balanced school attendance by the sexes. Simple correlations among these variables put a more secure foundation underneath this impression.[12]

The dependency ratio and household size appear to move together as shown by their joint attachment to F_4. Before one visualizes big, happy Indian joint families with lots of babies, however, an antidote must be supplied because neither variable interlaces directly with the other, or indeed with any others, at a level of simple correlational significance. Thus, the last four variables—the dependency ratio, household size, the change in the degree of urbanization over 1961–71, and change in the population-sex ratio—are non-starters. The latter measure, which would show a change in the ratio of men to women, was designed to capture migration. The idea is that men are more mobile and an increase in a district's sex ratio would ensue from an influx of male migrants, who might at some point be followed by families. The problem may be that the ratio of males to females is high in backward areas because of selective infanticide, in part, and that with modernization that ratio declines, hence moving in the opposite direction to what it would in response to migration. A growing, modernizing district could attract male migrants but that would be offset in this measure by a higher survival rate for females.

The overall failure of the social measures to relate to themselves or to urban and regional patterns as delineated in F_1 and F_2 is striking, given the literature on modernization in general and on Indian social-urban-economic interactions in particular. Related work has reached similar conclusions but microstudies of village populations conducted by anthropologists argue in largely qualitative but covincing ways for considerable

[12]These correlations are reflected in the minor loadings in this factor and positive loading in F_1. Again, high levels of these indicators are concentrated in the western districts and it would be wrong to read too much into them insofar as individual attitudes and behaviour are concerned. This regionally specific feature may not represent a pattern operating in the state as a whole to any degree.

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cross-sphere interdependence.[13] Similarly, studies of political ecology have often had difficulty in finding associations, much less clear casual connections, between the social and political realms and political behaviour.[14] The problem may be that the lack of caste data in the censuses, or from other sources, and the lack of more carefully conceived measures of family composition and styles, for example, renders impossible the finding of important connections at the level of aggregation of the districts. The burden would seem to rest, however, on those who do want to argue for strong interactions across the economic, social, political and geographical spheres. Until such are proven, disciplinary dividing lines may continue to provide a meaningful way of dividing up the work to be done on understanding India's society and economy.

As in all of the Indian states, the preponderance of the population in Karnataka lives in rural areas and finds work in agriculture and associated activities. Perhaps the two principal issues in assessing developmental patterns in rural India are the nature of agrarian relations—man to land, man to man, and man to technology—and the determinants of differences in yields and rates of change in agricultural output. Obviously data on agricultural practices, tenurial relations or work habits are scarce and not always appropriate to the specific concern of research. Despite these shortcomings, Table 4 sheds some light on Karnataka's *agrarian structure*. Variables not used in the two previous exercises are agricultural yields, fertilizer use, cooperative membership, high yielding varieties, pumpsets, tractors and agricultural credit. The remaining ten of the sixteen variables are carried over.

The first factor in Table 4 registers a phenomenon increasingly typical of India by 1971 and one that has mounted in significance since: the green revolution. It is now well understood that the green revolution embodied several linked features, so closely linked in fact were they that it became fashionable to speak of a "bundle" or "package" of components. In 1971 the green revolution in Karnataka was a limited force and since the state has neither a major wheat crop nor a large dependence on intensive rice farming its farm product mixture was not terribly suited to absorb the new technology. In contrast, of course, Punjab with wheat and such areas as the coastal rice tracts of Andhra Pradesh and Tamil Nadu were positioned to surge ahead. With much of its land committed to jowar, bajra, ragi and other arid land agricultures, Karnataka must await the

[13]T. Scarlett Epstein, Alan Beals, M. N. Srinivas and K. Ishwaran are among those who have written numerous articles and book-length treatments about villages in Karnataka.

[14]A comparatively successful effort is Biplab Dasgupta and W. H. Morris Jones, *Patterns and Trends in Indian Politics, An Ecological Analysis of Aggregate Data on Society and Elections* (Bombay: Allied Publishers, 1975).

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TABLE 4

AGRARIAN STRUCTURE

Variables	Factors			
	F_1	F_2	F_3	F_4
Yields	.921	.304	.085	−.227
Fertilizer	.727	.132	.236	−.105
Irrigation	.696	.141	.621	.093
Net area sown/Agr. labour force	−.645	−.180	−.542	−.056
School sex ratio	−.605	−.430	−.095	−.453
Agr. labourers/Cultivators	−.506	.120	−.158	−.062
Rainfall	.219	.929	.088	−.283
Female literacy	.379	.834	.092	.390
Coop. membership	.445	.630	−.496	.158
Net area sown/Total area	−.574	−.599	−.262	.202
Scheduled castes	.118	−.567	−.036	.112
High yielding varieties	.318	.077	.697	−.029
Pumps	.198	.154	.579	.122
Urban population	−.005	.132	.236	.803
Tractors	−.132	−.173	−.039	.552
Agr. credit share	−.066	.248	−.464	−.286
Cumulative variance explained (%)	24	43	55	67

emergence of dry farming methods. If such methods are slow in materialising, the Deccan areas of light rainfall may find themselves lagging behind areas of India and of the state where irrigation permits intensive, high-input farming. What is visible in Karnataka in 1971, then, is merely a localized initial thrust of the green revolutionary forces and while there has been some widening of the beachhead over the last decade the state is still on the periphery of the revolution.

In F_1 in Table 4, the underlying dimension is the modernization of agriculture. As has been true everywhere the key element is irrigation facilities in the form of wells, tanks or canals. The abundance of irrigation permits a control over water, particularly the ability to time its application in conjunction with fertilization, seeding and critical growing periods. Fertilizer use is closely allied with irrigation and the combination of water and fertilizer raises yields per hectare above average levels. Three other variables in F_1 enlarge the picture of the characteristics of high

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yield districts. A low land/man (net area sown/agricultural labour force) ratio means that agriculture is intensive rather than extensive. Higher yields are also associated with low numbers of agricultural workers relative to cultivators. This may suggest that ownership is a stimulus to progressive agriculture but at this level of aggregation the link is uncertain and may be due to more-or-less accidental regional overlaps. An interesting social variable that is tied to agricultural progressiveness is the school sex ratio. Yields are higher in districts where girls have more access to schools. This hints that social enlightenment is a background factor but, again, may be attributed simply to the luck of the draw. The overall pattern of the six variables in F_1 should not be too diminished by cautionary treatment, however, since there are rich literatures connecting high yields with (1) irrigation and high rates of modern input usage, (2) agrarian structure, and (3) social and attitudinal variables. And this is what is found here.

The second factor in the agrarian structure analysis is now a familiar one. Once again the powerful West-East separation makes its imprint. High rainfall, female literacy, cooperative membership, low rates of land utilization (because of forests and hills), and under-average scheduled caste populations are linked closely. Some interesting secondary loadings with F_2 and of its variables with F_1 add some insight into determinants of yields. The yield variable has a secondary loading in F_2 showing that districts with the just-listed features have somewhat elevated yields. They also have proportionately more females in schools. Female literacy has a secondary affiliation with F_1 lending further support to the contention that social conditions matter. Cooperative membership and a concentration of farming on limited arable land also display affinities for F_1.

There is one obvious discrepancy in the pattern of the total matrix that now needs to be recognized. The share of cropped area devoted to high yielding varieties (HYV) does not attach itself to F_1, its natural locus. The third factor finds a close linkage between HYV and the use of pumpsets. Secondary loadings are abundant in F_3. Irrigation, low land-man ratios, low cooperative membership, and little commercial bank lending to agriculture are linked to HYV districts. These findings are thus puzzling in two ways: the lack of association of high yields with the use of HYV and the failure of cooperative membership and farm lending to act in a supportive rather than contradictory way. The last anomaly implies that the development of cooperative and financial infrastructure has had little role to play—and may have lagged—in the utilization of HYV and pumps. An immediate question is how the pumps were financed.

The last factor puts urban population apart from the ecological, structural, and yield-benefiting aspects of Karnataka's agriculture. Deve-

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lopment of agriculture does not interact with or depend on the cities. This flies in the face of arguments for close urban-rural interaction as a necessity in the developmental process.[15] Another aspect of F_4 is that tractors are associated with urban centres. It is a well-established fact that tractors in India have been prestige goods. Around cities such as Bangalore rich doctors, businessmen and others have found it advantageous economically and tax-wise to buy farms and a tractor is a natural appurtenance of this mode of farming. In addition a major use of tractors has been for the transport of people and goods to market towns for business and recreation. This phase of tractor innovation may have passed by the 1980s but in the early 1970s tractors had a variety of roles connected more with urban than rural practices. The lack of financial development that could permit farmers to obtain credit for tractor purchases may also have barred their spread into rural use.

The factor scores for Karnataka's districts on F_1, F_2, and F_3 are presented in Table 5. The high-yield districts are Mandya, Shimoga, Coorg, Kolar and Mysore and the trailing districts are Gulbarga, Bijapur, Bidar, Raichur and Dharwar. Mandya has long been a centre of canal irrigation, aggressive extension campaigns, and mixed farming. Shimoga has about half its arable in rice and the highest ratio of irrigated to arable land in the state. Coorg, Kolar and Mysore each have sections and crops with irrigation and high yields, but on a less extensive scale. The bottom yield districts cultivate jowar, pulses and oilseeds and these dry crops are not capable of supporting high yields per hectare. As no surprise, Coorg and the Kanaras best embody the features of F_2, the West-East axis; Raichur, Kolar, and Mandya are at the bottom. Rice and irrigation are important traits in the leading districts characterized by the development patterns of F_3. Pumps, irrigation and HYV use are more common in the rice districts of S. Kanara, Shimoga, Kolar and N. Kanara. The scores of F_4 (which are not shown) feature Bangalore and Dharwar as urban districts with numerous tractors.

The overall image of Karnataka's agrarian structure may be styled "semi-modern". Because the state does not have extensive wheat or rice

[15]The notion that urban leadership is important as a stimulus to nearby agricultural development takes several forms. Urban markets for dairy, vegetable and fruit products can obviously shape local supply. It is true, too, that exposure to the ideas of the town and "town ways" can effect change. What is not evident, however, is that higher yields or innovations in agriculture follow in any straight line from urban propinquity. Urban-rural interactions are a facet of Indian development that needs considerably more analysis; the tendency has been for urban research to fall into the hands of sociologists or urbanists and for rural research to be dominated by agricultural economists or village anthropologists with little attention to cross-sector linkages.

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TABLE 5

F_1 Agricultural development I		F_2 West-East		F_3 Agricultural development II	
Mandya	2.45	Coorg	2.08	S. Kanara	2.30
Shimoga	1.39	S. Kanara	1.98	Shimoga	1.15
Coorg	1.12	N. Kanara	1.74	Kolar	.83
Kolar	.59	Chickmagalur	.96	N. Kanara	.49
Mysore	.44	Bangalore	.25	Bangalore	.42
Tumkur	.29	Dharwar	.10	Mysore	.31
Chitradurga	.22	Shimoga	.07	Chitradurga	−.02
Bangalore	.20	Hassan	−.09	Dharwar	−.10
N. Kanara	.12	Bijapur	−.30	Belgaum	−.12
Bellary	−.11	Belgaum	−.35	Hassan	−.18
Chickmagalur	−.12	Gulbarga	−.40	Bidar	−.19
S. Kanara	−.13	Bidar	−.48	Tumkur	−.19
Hassan	−.16	Chitradurga	−.57	Raichur	−.25
Belgaum	−.25	Tumkur	−.59	Chickmagalur	−.26
Dharwar	−.72	Mysore	−.63	Mandya	−.27
Raichur	−.83	Bellary	−.68	Bijapur	−.38
Bidar	−1.29	Raichur	−.76	Gulbarga	−.38
Bijapur	−1.52	Kolar	−.80	Bellary	−.42
Gulbarga	−1.67	Mandya	−1.53	Coorg	−2.76

belts a full-blown, widely diffused green revolution was impossible in the early 1970s and remains largely unattainable in the early 1980s. Agricultural development in the last decade has had limited depth and diversity, being centered on a few districts such as Mandya and Shimoga where irrigation could be brought to bear on rice, cash crops such as sugarcane, and other intensive crops. Fertilizer use and HYV adoption were limited by poor extension, a lack of credit and cooperative infrastructure, and, in places, a complex of social backwardness and adverse agrarian relations. Technologies such as those associated with pump and tractor use were not keyed into the other components of the high-yield revolution. On the whole, then the picture is one of scattered advances but also of a failure to put together for the state as a whole a workable, balanced and diffused

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scheme for rural development. Nonetheless the state has continued to do a good job of generating adequate food for its residents, with some left over for export at times; cash crops such as cotton and sugarcane have been a sometimes buoyant feature of agriculture. Its overall rank amongst India's states in terms of growth of agriculture is high middling, clearly ahead of laggards such as Bengal and Bihar and behind only those such as Punjab or Tamil Nadu where the green revolution has had wide impact.

The diverse and contrasting experiences of Karnataka's districts with agricultural development lead one to try to qualify the different district-wise rates of agricultural growth and to ascertain the determinants of those rates. An *agricultural growth* analysis therefore becomes the next priority. Agricultural growth rates for Indian districts are extremely unstable because of the irregularities of the monsoon. This is especially true of the dry districts where wide swings in cultivable area and output are common. Yet the dry districts are also those where sustained growth is less likely so that their instability creates problems in identifying the more stable sources of growth in the form of irrigation, fertilizer use and the adoption of HYV. Even over a period as long as a decade average annual growth rates are heavily influenced by conditions in the beginning and terminal years—and this remains true even if averages of several years are taken. One study estimated the annual growth of output of Tumkur district as −7.4 per cent over the 1959/60–1968/69 period while another attributes a growth rate of 4.5 per cent during 1962/65–1970/73.[16] An added problem is that growth rates are normally taken for a subset of crops which may vary from close to 100 per cent of total crops in certain districts to as little as ten per cent in others.

These statistical problems (and others) limit the effectiveness of any effort to identify the determinants of agricultural growth. The question is such a vital one, however, because isolating and manipulating those determinants must be the basis for effective policy, that even a tentative and preliminary gesture may be valuable. In Table 6 are shown the results of a factor analysis in which yield levels per hectare, the growth in output in 1962/65–1970/73, and the change in yields over the same period are central variables.[17] The determinants of yield differences are essentially the same as in the analysis of agrarian structure. Irrigation and fertilizer

[16]The first figure is from a photocopied table passed on by Dorris Brown and the second is from the Bhalla and Alagh study cited in item 38 of the appendix.

[17]Agricultural growth rates measure the total change in the value of a set of crops over a given period of time. Such growth can be attributed to changes in area and to changes in yields, most simply, although one can also allow for an interaction term. Here agricultural growth refers to the change in value of output and the change in yields is examined as a separate variable.

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TABLE 6
AGRICULTURAL GROWTH

Variables	Factors			
	F_1	F_2	F_3	F_4
Yields	.840	.164	.512	−.075
Irrigation	.755	.544	.092	.164
Fertilizer	.642	.374	.296	−.018
Agr. labourers/Cultivators	−.507	−.034	−.005	−.062
Pumps	.089	.795	.071	−.120
HYV	.351	.780	−.065	.098
Irrigation change	−.000	.713	−.051	−.046
Coop. membership	.024	−.071	.995	−.071
Rainfall	.236	.213	.584	−.325
Tractors	−.310	−.016	.061	.949
Population change 61–71	.204	.136	−.178	.632
Agricultural growth	.358	−.105	−.196	.555
Yield growth	−.269	.132	−.327	.022
Cumulative variance explained (%)	22	34	51	65

are important. There is the association again of pumps and HYV. A variable showing the change in irrigation over the 1961–1971 period does not explain growth or yield changes as hoped but does associate with pumps and HYV suggesting that pumps have been a major source of irrigation diffusion. F_3 simply identifies Coorg as an area of high cooperative membership and yields, with little portent for the state as a whole.

Agricultural growth is weakly associated with the complex of variables found in F_1. The simple correlations among the variables are very small, however, and regression analysis with growth as the dependent variable with various combinations of explanatory variables did not prove valuable.[18] The highest loading for agricultural growth is .555 in F_4 which

[18]Agricultural growth was found to be related in a stepwise regression system to canal irrigation and scheduled caste population. HYV use was linked to total irrigation and change in irrigation. Change in yield was not significantly related to any of ten plausibly relevant variables. The expansion of irrigation is a reasonable explanation, although obviously a partial one, for growth of agricultural output since the intensity of land use is rising. Why a high proportion of scheduled castes should matter is less evident. The answer may be simply the random association of the two, but a causal role could be played by an abundance of farm labor drawn from scheduled caste ranks, especially if that labor works for very low wages and is so politically weakened that it is tractable. The HYV phenomenon is essentially a link between rice areas and irrigation.

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is probably best seen as an urban dimension since tractors are included along with population change 1961–1971. The latter variable was intended to see if more rapid population growth had pushed or been led by agricultural growth. The explanatory power of the remaining variables vis-a-vis the growth rate is thus in total negligible; problems of accurately measuring the rate are as much responsible as the elusiveness of crucial determinants. The results for the measure of pure yield growth (removing the effects of change in area among others) are equally unfruitful.

While the examination of agricultural growth, yield growth, and their determinants is disappointingly indeterminant, the four analyses of geographic structure, urban-social relations, agrarian pattern, and agricultural growth have been illuminating. They confirm and quantify a number of major aspects of the structure and development of Karnataka while at the same time providing suggestions for microlevel study.

III

The development efforts of the state government have been guided by several priority concerns. Anandakrishna, the Development Commissioner, and Nanjundappa, Secretary to the Government Planning Department, who are skilled technocrats, had responsibility for the *Draft Five Year Plan, 1978–83*.[19] This sophisticated and humane document is arguably superior in its perceptions and preparation to the national documents although it must clearly work within constraints of the national planning program. In the *Plan* are identified the following foci for action: unemployment and under-employment, low productive efficiency in some sectors, underutilization of installed capacities and of resources, the uneven spread of growth benefits, and failures to meet the minimum needs of life, including housing and nutrition.[20] The aim was to build on the six per cent real grow rate of the late 1970s with a growth target of 7.5 to 9 per cent while uplifting employment and meeting minimum needs targets. These ambitious growth hopes were obviously based on a best-case result but were felt to be necessary to make any headway against the tide of mounting population, continued poor human resource creation, and unchanged dependence on traditional or semi-modern agriculture for employment and income. Irrigation, hydropower development (stressed because of the lack of coal or petroleum), and infrastructure improvements were to be important instruments of progress.

A thrust of the recent planning efforts has been to generate district planning documents keyed to the national and state plans on the one side and to taluk and village plans on the other. Economic equity and the

[19]See *Draft Five Year Plan (1978–83)*, Preface.
[20]*Ibid.*

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feeling that long-run development must be based on some balance of growth across regions are two of the motives for the regional spread of development impulses. The political process helps "share the spoils" between richer and poorer regions. A story which is correct enough to be true arose from a lightning tour of the state some years ago. A remarkable stretch of good roads and tidy bridges over every possible dip and culvert yielded to poor roads and neglected wayside. It became apparent with observation that almost every one of the villages then being sped past had a fine school, prominently visible. A comment provoked a response from a travelling companion. "Yes, the Public Works Minister is from that place back there and now we are near the home of the Education Minister."[21]

The fourth and fifth plan documents undertook elaborate exercise to rank districts according to agricultural, industrial, infrastructural and social attributes. The purpose was to identify leading and laggard districts in key years, such as 1961 and 1971, and to see how ranks change over time.[22] An analysis of these ranks shows a tendency for interdistrict variation to fall over time for such measures as irrigation, radio, telephones, road mileage and village electrification.[23] Othe regionally-oriented aspects of planning involve the identification of drought-prone talukas. The fourth plan designated 88 of the state's 175 talukas as susceptible to drought or scarcity in three years of five.[24] Because of the characteristics of the Malnad zone, it also has been accorded special treatment. A Western Ghat development program involves 55 talukas in nine districts of the state.[25]

There are sufficient constraints on the developmental process in Karnataka that even a well-framed plan cannot generate miracles or overnight transformations. The last two decades have seen neither a structural transformation of the economy away from agriculture nor relief from the relentless pressure of a burgeoning population. Even ignoring the dependence of any single state on the economic health of India as a whole, and on national political economic objectives and policies, there still remain internal barriers to appreciable economic gains. These may

[21]Adams vouches that the story is true since he was the observer. Whether in 1968 the ministers in fact conformed to the story was never independently verified.

[22]*Fourth Five Year Plan* (*1969–74*), p. 22; *Fifth Five Year Plan* (*1974–79*), pp. 870–71.

[23]Unpublished calculations by Hanumappa.

[24]*Fourth Five Year Plan* (*1969–74*), p. 17.

[25]The Western Ghat Development Plan is presented in a separate part of the *Draft Five Year Plan* (*1978–85*) and discussed in other planning documents. For a discussion of the planning of rural development at the district level see V. M. Rao, "Nature of Rural Underdevelopment, A Field View", *Economic and Political Weekly*, XVI (10th October 1981), 1655–1666.

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be briefly mentioned on a sector-by-sector basis as follows:

—A green revolution in agriculture is severely limited by the arid character of much of the state, where large northern and southern tracts have sparse and variable rainfall. Hybrid jowar or ragi to which fertilizer can usefully be applied is still more a dream than a reality, given the essential dependence of such a package on rainfall timing. There are limits to river utilization and to ground water and with development there is certain to be more contest between agriculture and industry for water. There are avenues in dairying, livestock, poultry and horticulture but these require new technologies, capital, management, dietary changes and production of fodder and grain inputs.

—Industry has on the whole prospered in the state which has a strong mixture of central enterprises, state businesses, and private firms. In this area the major constraints are capital, management and human resources. Industrialization in India has not so far been capable of generating sufficient jobs to do much more than absorb urban population increase without any mopping up of rural under-employment. Heavy industry and consumer industries aimed at the affluent do not have immediate payoffs for the poor.

—The crucial infrastructure sector is currently a bottleneck. Power is short and transmission lines in and out of the state are inadequate. A long-term disadvantage is the lack of coal and petroleum. This limits iron and steel development as well as aluminium smelting. Feedstocks for fertilizer factories will also have to be imported. The rail lines are not well tied into India's broad gauge trackage and there are insufficient east-west links to link the ports to inland resources.

—A major, if not the overpowering, factor is the underlying demograpic pressure on the state's resources, energy supplies, and employment capacity in agriculture and industry. Unfortunately a single Indian state has no reason to implement strict population controls through incentives and disincentives since it cannot control immigration from other states. Considering its resources and economic structure, Karnataka would be a bountiful country in 1981 or 1991 or 2001 with a hypothetical population of only ten or fifteen or even twenty millions. Instead it is a place that faces the future balanced on a sword's edge. The 1981 provisional population total for the state is 37,043,451. This is a 26.43 per cent gain over 1971, represent-

[26]A strong call for increased attention to population growth and policy is V. K. R. V. Rao, "Inter-State Variations in Population Growth and Population Policy", *Economic and Political Weekly*, XVI (19 December 1981), 2105–2108.

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ing an absolute addition of 7,744,437 persons. The decennial growth rates for 1951–61 and 1961–71 were, respectively, 21.57 and 24.22 per cent.[26] Faltering steps in economic planning, a failure of political consensus or will, or exogeonus events in the national or world economy and polity can tip Karnataka towards a disastrous demographic and economic crisis.

Note: Computer services provided by Computer Science Center, University of Maryland, College Park.

APPENDIX
DESCRIPTION OF VARIABLES

(*All data are for 1971 unless noted*)

1. *Female Literacy*: Proportion of females in a district who can read and write in any language. Unit: percentage. Range: 7–38. Source: Census of India, 1971.
2. *Scheduled Caste*: Members of groups listed in the census as Scheduled Castes as a proportion of the population of a district. Does not include Scheduled Tribes. Unit: percentage. Range: 5–24. Source: Census of India, 1971 or Mysore at a Glance (hereafter MAG) 1972.
3. *Household Size*: Average number of persons per household; total population divided by total number of households. Unit: numbers. Range: 5.1–6.4. Source: Census of India, 1971.
4. *Roads*: Kilometers of PWD maintained roads per square kilometer of total district area. Would exclude tracks and municipal roads. Unit: kms. ($\times 100$). Range: 17–95. Source: MAG 1972, for 1971–72.
5. *School Sex Ratio*: The ratio of male to female students in all levels of schooling from entry through secondary education. Unit: males per 100 females. Range: 125–243. Source: Statistical Abstract, Mysore 1971, for 1970–71.
6. *High Yielding Varieties*: The proportion of net area sown planted with high yielding varieties. Unit: percentage. Range: 1.5–10.0. Source: MAG 1971, for 70–71.
7. *Tractors*: Number of tractors in the district. Not normalized by hectarage or work force. Unit: numbers. Range: 37–815. Source: MAG 1972 for 1971–72.
8. *Cooperative Membership*: The ratio of the number of cooperative society members to the agricultural labor force (cultivators plus agricultural workers). Quality is dubious since many memberships and societies may be inactive. Unit: percentage. Range: 20–231. Sources: membership, MAG 1971; Workers: Census of India, 1971.
9. *Banking Facilities*: The number of commercial banks per million

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people. Unit: numbers. Range: 1.5–11.1. Sources: Banks: MAG 1972; Population: Census of India, 1971.

10. *Pumpsets*: The number of irrigation pumpsets normalized by net area sown of the district. Unit: numbers (×1000). Range: 23–843. Source: MAG 1972 for 1971–72.
11. *Carts*: The number of bullock carts divided by the area in square kilometers of the district. Unit: numbers (×10) per km². Range: 2–73. Source: Statistical Abstract, Mysore, 1971 for 1966.
12. *Cattle*: Head of cattle per 100 hectares of district area. Unit: numbers. Range: 30–96. Source: Karnataka at a Glance (hereafter KAG), 1975.
13. *Goats*: Head of goats per 100 hectares of district area. Unit: numbers. Range: 1–31. Source: KAG 1975.
14. *Change in Degree of Urbanization*: Change in the proportion of persons living in urban areas, 1961–1971. Unit: index, percentage in 1971 minus percentage in 1961 (×100). Range: −197 to 549. Source: Census of India, 1971.
15. *Change in Sex Ratio*: Ratio of males to females in the total district population of 1971 minus the same ratio in 1961. Unit: males per 1000 females. Range: −42 to 50. Source: Census of India 1961 and 1971.
16. *Long-run Population Growth*: Change in population 1901 to 1971. Unit: percentage. Range: 85–279. Source: Census of India, 1971.
17. *Change in Irrigation Availability*: Change in proportion of net area sown irrigated from any source, 1961–1971. Unit: difference of percentage (×10). Range: −11 to 132. Source: Statistical Abstract, Mysore, 1971, 1961. Outliers of +331 (S. Kanara) and −140 (Chickmagalur) adjusted to be only half again as great as next adjacent values.
18. *Literacy*: Proportion of the population able to read and write. Unit: percentage. Range: 19–44. Source: Census of India, 1971.
19. *Commercial Cropping*: The share of non-food crops in total cropped area. Unit: percentage. Range: 7–38. Source: Statistical Abstract, Mysore, 1971, for 1970–71.
20. *Urban Population*: Proportion of people living in urban areas. Unit: percentage. Range: 12–56. Source: Census of India, 1971.
21. *Average Rainfall*: Average annual rainfall over the long run, varying from a 5 to 80 year average depending on the district's records. Unit: mm. Range: 575–2933. Source: MAG 1972.
22. *Agricultural Labor Force*: The proportion of cultivators and agricultural laborers in the total labor force. Unit: percentage. Range: 41–86. Source: Census of India, 1971.

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23. *Radios*: Number of radios per 1000 persons. Unit: numbers. Range: 9–64. Source: MAG 1972, for 1971–72.
24. *Rice*: Fraction of total cropped area devoted to the cultivation of rice. Unit: percentage (×10). Range: 15–770. Source: Statistical Abstract, Mysore, 1971, for 1970–71.
25. *Ragi*: Fraction of total cropped area devoted to the cultivation of ragi. Unit: percentage (×10). Range: 0–578. Source: Statistical Abstract, Mysore, 1971, for 1970–71.
26. *Cotton*: Fraction of total cropped area devoted to the cultivation of cotton. Unit: pereentage (×10). Range: 0–245. Source: Statistical Abstract, Mysore, 1971 for 1970–71.
27. *Net Area Sown*: Proportion of total area of district cultivated at least once. Unit: percentage. Range: 10–83. Source: MAG 1972 for 1970–71.
28. *Dependency Ratio*: The ratio of non-workers to workers in the population. Unit: numbers. Range: 1.4–3.13. Source: Census of India, 1971.
29. *Growth of Agriculture*: Growth in output of 19 crops during the period 1962/65 to 1970/73. Unit: per cent per year. Range: —1.1–6.9. Source: G. S. Bhalla and Y. K. Alagh, "Spatial Pattern of Levels and Growth of Agricultural Output in India", Center for the Study of Regional Development, Jawaharlal Nehru University, New Delhi, n.d., mimeographed.
30. *Manufacturing and Construction Labor Force*: Proportion of workers in manufacturing and construction in total work force. Unit: Percentage (×10). Range: 36–216. Source: Census of India, 1971.
31. *Trade and Commerce Labor Force*: Proportion of workers in trade and commerce in total work force. Unit: percentage (×10). Range: 37–105. Source: Census of India, 1971.
32. *Population Density*: Number of persons per square kilometer. Unit: numbers per km^2. Range: 83–421. Source: Census of India, 1971.
33. *Agricultural Credit*: Agricultural credit extended by commercial banks as a proportion of total credit outstanding. Unit: percentage. Range: 3–71. Source: Statistical Profile, Districts of India for 1971.
34. *Fifth Plan Index*: Composite index of district scores on scales for infrastructure, agricultural development, industrial development and utilization of land. Unit: index. Range: 72–200. Source: Government of Karnat ka, Fifth Five Year Plan (1974–79), pp. 870–1.
35. *Irrigation*: Proportion of net area sown that is irrigated. Unit: Percentage. Range: 2–44. Source: MAG 1972.
36. *Agricultural Workers*: Ratio of agricultural workers to cultivators. Unit: percentage. Range: 15–85. Source: Census of India, 1971.
37. *Cultivable Land per Worker*: Amount of net area sown per worker in agricultural work force (cultivators plus agricultural laborers).

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Unit: hectares per worker (×100). Range: 46–282. Source: MAG 1972 and Census of India, 1971.

38. *Crop Yields*: Output for 19 crops divided by hectarage committed. Unit: Rs. per hectare. Range: 409–2278. Source: G. S. Bhalla and Y. K. Alagh, "Foodgrains Growth: A Districtwise Study". Centre for the Study of Regional Development, Jawaharlal Nehru University, New Delhi, 1981, mimeographed tables.

39. *Fertilizer Use*: Fertilizer consumption in the form of modern nitrogen, potassium, and potash compounds. Unit: tons per 1000 hectares of net area sown. Range: 1–64. Source: G. S. Bhalla and Y. K. Alagh, "Foodgrain Growth: A Districtwise Study", Center for the Study of Regional Development, Jawaharlal Nehru University, New Delhi, 1981, mimeographed tables.

40. *Change in Crop Yields*: Share of change in total output of 19 crops attributable to changes in yields. Unit: percentage of change in total yield. Range: −300–800. Source: G. S. Bhalla, Y. K. Alagh, "Spatial Pattern of Levels of Growth of Agricultural Output in India", Center for the Study of Regional Development, Jawaharlal Nehru University, New Delhi, n.d., mimeographed. Bidar district value of −1100 treated as an outlier with new value of −300.

Note: Fuller citations of the official sources mentioned in the appendix are as follows:

1. Census of India, 1971, Series 14, Mysore, Part II–A, General Population Tables: Part II–B (i), *Economic Tables*: Part II–C (i), *Social and Cultural Tables*, Part V–A, *Special Tables on Scheduled Castes and Scheduled Tribes*. Most information is repeated in statistical abstracts of *Mysore* or *Karnataka at a Glance*.
2. Government of Mysore, Bureau of Economics and Statistics, *Statistical Abstract of Mysore*, 1970–71, Bangalore, 1971. Available for some later years.
3. Government of Mysore (Karnataka), Bureau of Economics and Statistics, *Mysore (Karnataka) at a Glance, 1971, 1972, 1973 and 1975*, Bangalore, 1972, 1973, 1974, and 1976.

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THE BASIS OF LIFE—INNOVATOR'S ECONOMICS

An Interpretation of "Japanese Teachings" as an Integration of the Teachings of "Gods indigenous to Japan", Confucianism and Buddhism

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The Japanese spirit as an integration of Gods indigenous to Japan ("Sinto"), Confucianism and Buddhism seems to have formed today's economy and society in Japan, whether for good or bad. It looks as if modern societies in Europe and America were once created by Puritanism and the other Christianism.

"Shinto can be conditioned as a naturalistic religion that grew out of the everyday life of the Japanese people in primitive times, but it was refined by the influences of Confucianism and Buddhism, and the Polytheistic nature of Shinto made it easy for Japanese to accept religions coming in from foreign countries."

"Sinto" embodies the traditional imagination of ancient Japan and polytheism. The feature of the teachings is to be centered around an Emperor, "Tennō", in the integration of a nation. And so a number of stories and hypotheses, which affirmed and exaggerated it, have been spread.

On the other hand, both Confucianism and Buddhism were foreign ideas. These ideas have been well harmonized and fused, and created *the integrated "Japanese Teachings"*.

"Confucianism reached Japan in the early fifth century and had a profound influence on Japanese morals and the Japanese view of life".

Confucianism has roots in "loyalty and piety". Of course, it is a common sense in human nature that the fundamental of universal order consists in a broader sense of "children to parents". In Confucianism, however, there is classified paternalistic order which has been absolutely ranked up from parents to sovereign through the master and servant. The social system of Japan in which status and title have been esteemed, has been permanently static, even though performance could be dynamically transferred to status.

Even Mencius (Mōshi) who esteemed the people's will, did not think that peoples have a free choice of political structure, and he thought it is limited to royal system. The peoples' will is drastically differed from the free choice in the Old Testament.

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This idea to maintain the social order was applicable to the above-mentioned central idea that the Emperor is the center of the nation, and His Majesty has been made to play an important role of convenient "invisibility-working cloak" by the man of influence in the political world from generation to generation.

What those with political ambition sought after was a really powerful status—the status of Shogun, for example, not a nominal supreme status. Thus, as a result of the Taika Reform, the status of the Emperor became sacred, but at the same time the Emperor was forced to be neutral politically. The status of the Emperor was no longer important politically. It was deeply recognized by nobles, generals and priests with political ambition that the status of the Emperor was not something to capture at the risk of their reputation—anyone that captured the status of the Emperor was regarded as a traitor to the country. So they wanted to be the actual ruler under the nominal rule of the Emperor, obeying the Emperor or at least refraining from rebelling against the Emperor.

"The first introduction of Buddhism into Japan was in the sixth century in the form of Buddhist statues and scriptures received as gifts from Korea. The religion did not spread widely, however, until Japanese and Chinese Monks began actively exchanging visits in the ninth and tenth centuries." (Supplement supplied)[1]

The foundation of Buddhism lies in "Sūnyatā" which means non-substantiality, the unknown, having no self, no duality. This has two contradictory functions of self-identity which first deny one's ego and become to *Sūnyatā*(*Kū*), and then self-actualize.

- ☐ *Yad rūpam sā sūnyatā* (Substance indeed Emptiness): Every manifested thing is essentially non-substantial. Vanity of vanities and all is vanity.

- ☐ *Yā sūnyatā tad rūpam* (Emptiness indeed Substance): Simultaneously, non-substantiality is embodied in every manifested thing.

Accordingly the realization of non-substantiality is accomplished by breaking up attachments to an ego-personality and *abandoning one's own ego*, and true self is actualized through the consciously broader self beyond little selfishness after abandoning an ego.

"Actualizing the true self is to actualize one's own objective idea, or to unite together self and object. From this viewpoint, it can be said that doing "goodness" is necessarily love. Love in itself is a movement of

[1]Nippon Steel Corporation, Personnel Development Office, *Nippon: The Land and Its People*, 1982, p. 47 & p. 253.

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mind which indentifies subject and object."[2]

The philosophical principle of Buddhism is based on the fundamental perception of three doctrines, as follows:

An impermanence of all existence	: All thing in nature is impermanent, ever-changing and ephemeral.
An ego-lessness of all existence	: All thing in nature is ego-less and non-substantial.
NIRVĀNA (Perfect Tranquility)	: All thing in nature is mortal and then returns to non-substantiality.

There is a famous "IROHA-song" in Japan:

Irowa Nioedo Chirinuruo
Wagayo Tarezo Tsunenaramu
Uino Okuyama Kefukoete
Asaki Yume Miji Ehimo Sezu

put into English,

Although every colourful flower will have an odour,
it is destined to be scattered someday.
Our world is *in all impermanency.*
We would strive for Truth every day and
today become trueness more than we were.
Therefore we must not think only of the present,
and merely be comfortable.

It will be indispensable to everyone in near future that human personality and resources could be developed in an origin of human being in one's self, and fulfilled in mind by inner-check, self-control and self-training. For example, "Zen"[3] is defined as an enlightened religious and mental state attained by achieving serenity of mind. One of the practices used to obtain this serenity of mind is called "Zazen" or "Sitting in a deeply silent meditation".

Originally the doctrines of Saddharmapuṇḍaīka-sutra initiating into the esoterica of Buddhism are the way to become self-restraining, self-training and ego-less under any circumstances.

In feudal society, however, strict commandments alone were given, so only negative aspects had taken precedence over. By both the material and mental functions of the harmonious integration of "Gods in Japan", Confucianism and Buddhism, "the nation based on collectivism", in which all the people have been united together, has been built up.

[2]Ikutaro Nishada, *Study of Goodness*, Iwanami-Books, pp. 192–193.
[3]cf. "The Zen sect is one of the denominations of Buddhism", in *Nippon*, p. 257.

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Many capitalists who had not enough backbone to resist the government and obtained their current status by the government's favour applied to the government for protection even thereafter and continued to be loyal to and cooperative with the government.

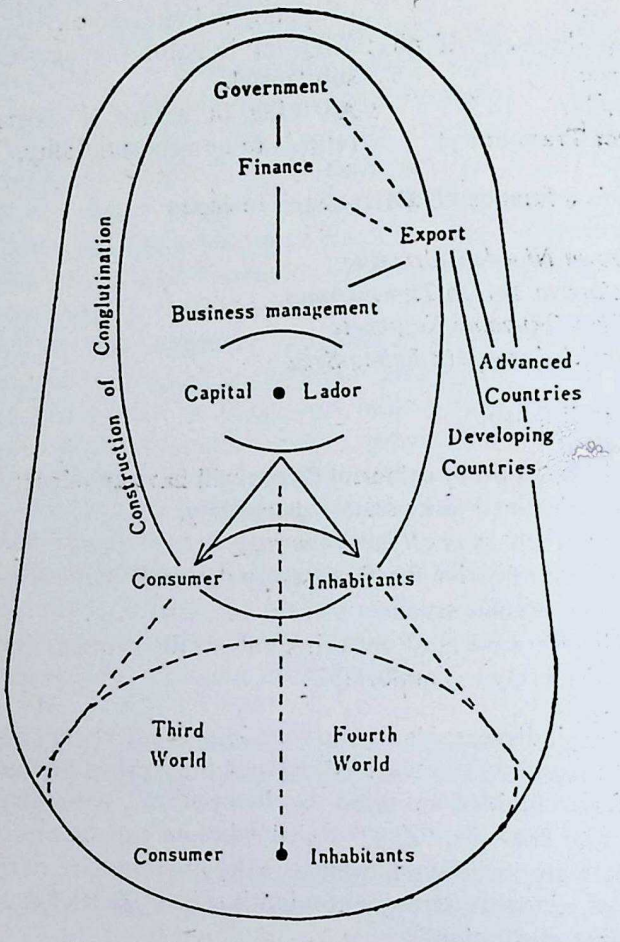

Figure 1. Japan Inc. (Freedom versus Control)
Construction of Conglutination based on Mutual Dependence and Spoiled Mind.

If the Japanese had not accepted the faith in frugality, industriousness and another prerequisites of capitalism, modern capitalism would never have materialized in Japan. Thanks to the educational policies of the Tokugawa Shogunate, Confusianism had spread wide and deep among the Japanese. In Japan Confucianism was considered not a religion but an ethical system. And it has been taught to the Japanese, directly and indirectly through *bushido*, that industriousness and frugality are a sort of noble way of life.

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But on the other hand, the outlet of collectivism and materialism (by which the spiritualism was over-reacted in accordance with Japanese character of over indulgence) is the "castle" of one's own business enterprise, in which income and wealth have been collected, as if worker bees had toiled very hard to bring in the honey.

The Japanese industriousness are much owed to the philosophies of Confucianism and Buddhism. They have been already established in the minds of the Japanese people. "Work for the Japanese is first and foremost the expression of life. To live is to work, to work is to live."[4]

The following is a poem by Takuboku Ishikawa (a famous poet in Japan).

Kokoroyoku Wareni Hataraku Shigoto Are
Soreo Shiagete Shinanto Omou

put into English,

Willingly I accept the work allotted to me.
When I accomplish it, I will die.

The factor which must not be neglected here is that the Japanese have generally a propensity to indulge themselves in emotionalism. Accordingly, the complete self-indulgence in one's own business is contradictory to the integration of a nation. This relation is a trade-off. (See Figure 2)

Generally, a society proceeds from a feudal, forced economy to a free economy, and has a tendency to proceed into individual combination, individualistic solidarity and collectivism. There is downward-sloping curve for the integration of society.

While the region of (c) is increasing, the integration of a modern nation, (a) increasingly declines in Figure 2. But it has large possibility to go back to nationalistic tendency. Fortunately "a small government" may proceed forward (0′) and an economically cooperating nation, which is based on international solidarity, may proceed to (0″). However, there is a strong probability that it will turn back to military nationalism. In that case it is inclined to develop into an austere nation (0‴), which shares limited resources, and at last to become a military nation (0⁗).

On the other hand, however, it is true that the number of life innovators is on the increase. Life-innovators are industrious in order to defend their own values of living and are trying to cut down waste and consumption.

New movements have already been started. For example, new-born and new-bred employees have emerged. They have enough ability and

[4]R. J. Barren, *Study of Japanese Business*, President Co., Tokyo, p. 48.

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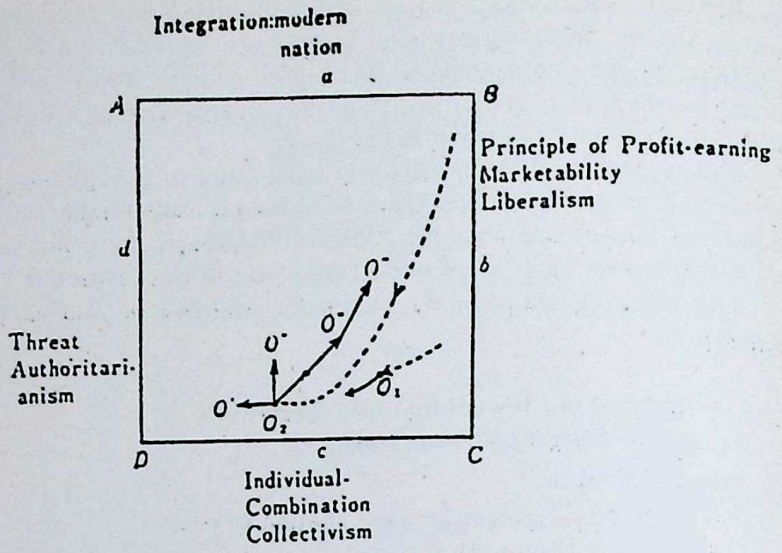

Figure 2. The Square of Social Combination.

will to work all-round, and at the same time they are eager to enhance the qualities of their private lives. They are soft and adaptable to new situations in comparison with the traditional "company men" in Japan.

The emergence of such new-bred employees reflects the trends of diversification and individualization of consumers' needs, which are promoted by these human-capitals to the rank of life-innovators' needs, i.e. from physical "love need" to spiritual "esteem need" and "self-actualizing need".

And on the other hand, the above-mentioned human-capitals have caused shift of weight in employment and income share in our industries, from heavy-chemical industries to manufacturing-related service industries, then to external stimuli industries (recreation, leisure, etc.) and then to human resources industries (hobby, culture, etc.).

More and more company employees will be aspired themselves to become multi-talented professionals rather than remain to be "company men" in the near future, to cope with heavier burdens of secular stagnation, inflation and heavier taxations.

Furthermore, the trends of diversification and individualization of life-innovators' needs are duly composing a basis of our peace, economy, which is largely dependent on *global-wide information popularization*, and *developments and improvements of human qualities*. These factors are steady and permanent human sources of inspiration.

It is a life-innovator or group which is burning to strive for inner-checks and environmental improvements. The life-innovators, therefore, are consisted of the above-mentioned human-capitals, self-actualizing

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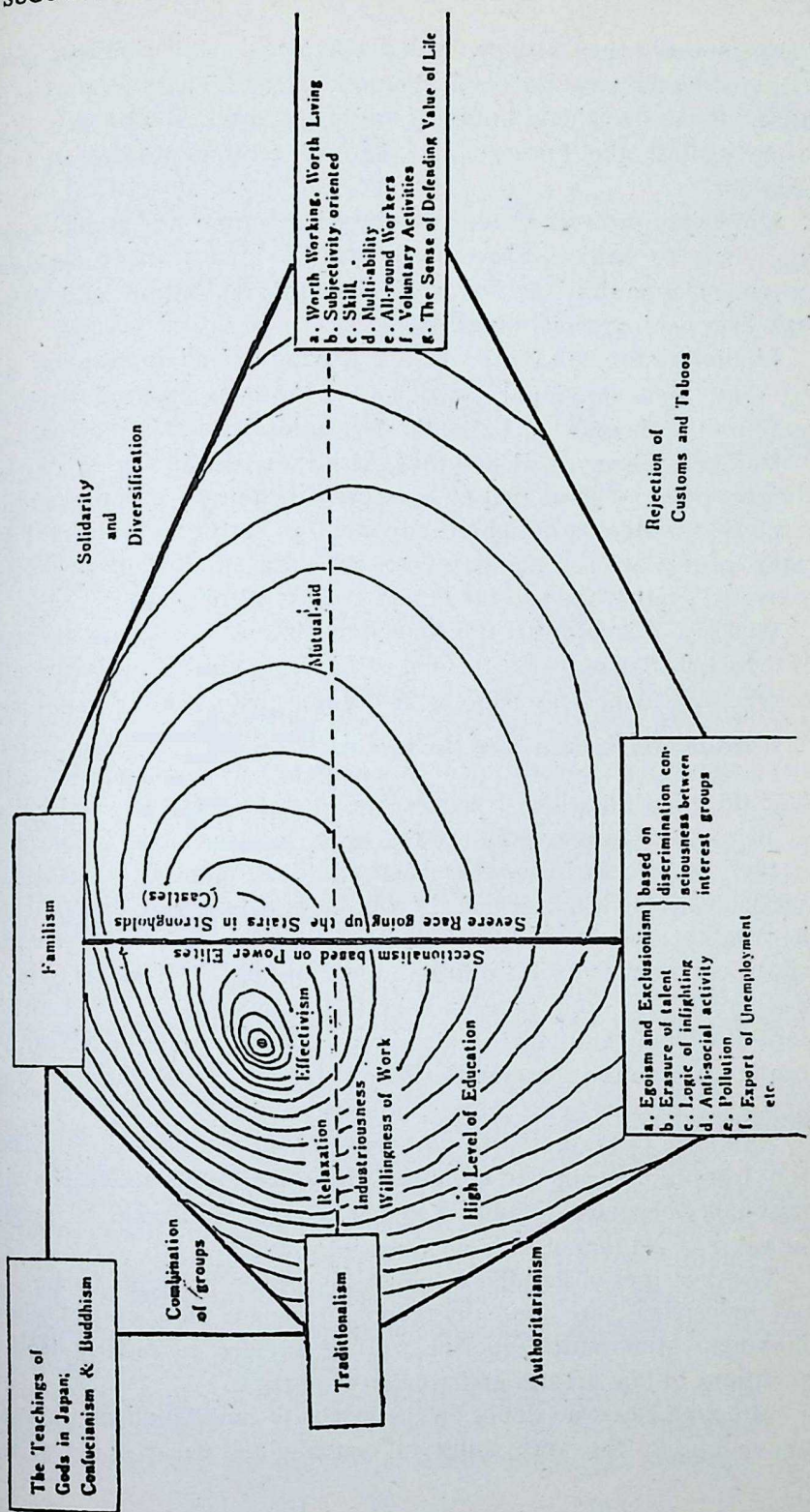

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consumers, and their groups. Such a conceptual revolution can never be triggered by the power elites in the political, administrative and economic circles. It can be achieved only by the life-innovators who are standing firmly against the burdens of inflation, great depression and heavier taxations.

Unlike the pressure groups which seek to power and profit, suppressing others to achieve these purposes, life-innovators constitute soft movement organizations for achieving true-realization and defending their lives against social maladies.

Life-innovators are those who are striving to lead intellectual and at the same time emotional, ascetic and at the same time industrious lives, based on the thoughts of Philanthropy, solidarity and self-actualization.

In a general way, it is said that there is an idea in the typical pattern of Europe and America that an enterprise is opposed to a life-community as a family centered around an individual. In Japan there were formerly many people who were slaves to the idea of allegiance to "my own company", rather than to the family and the community.

And also it is said that the American business enterprise is activated by the acquisition of profit. It is not a "Life-community", it is not a family, and the individual is not supreme in the enterprise. But Japanese employee is happy to regard himself as a member of a life-community, especially of his company. This conception of the company could be explained in greater detail for the edification of Westerners. For one example, see Figure 3.

At any rate humanization of the work location and reconsideration of the collectivism have been practiced. (See Figure 4.) At present there is a double structure in which the vitality of enterprises, or (b), rides on the vitality of a community based on the family, or (a). But someday (b) will be coordinated as a fire link in the chain of (a). It seems to be recognized that the work location is perfect in its very unity with the whole stage-like family and local commodities. Various groups of life-innovators sprang up from the communities based on a variety of families and the meetings for social get-togethers, hobbies or tastes.

As shown in Figure 5, we note that in cooperation with the conversion from a consumer to a life-innovator, the family which has a whole personality beyond rationally is higher as regards the rate of growth in the value of life than a rational work location.

The doctrines of Buddhism, which makes it a principle to be austere and industrious, are gradually reviving from the viewpoint of wholeness thinkings. Materialistic egoism will be obliged to modify itself under conditions of low growth and secular stagflation.

Although I cast no doubt on the merits of individualism and modern nationality, in the very midst of maturity and decay, the demerits are

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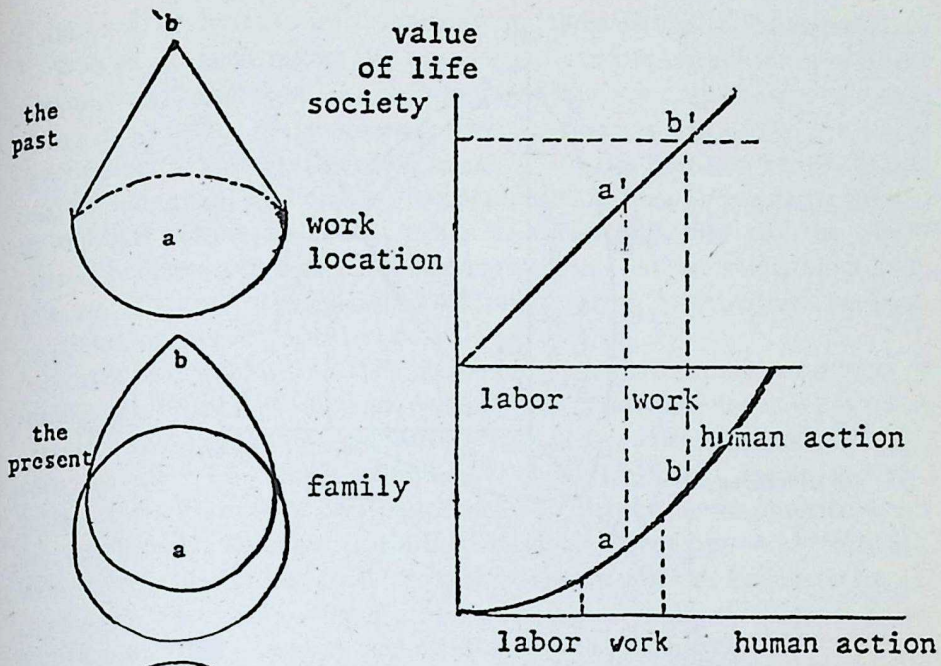

Figure 5. The Space of Human-Actualization.
Note: aa′: the turning point between labour and work
bb′: the standard point of life-innovators.

← Figure 4. From the Serfdom to Business to the Coexistence of Family, Community and Business
Note: a: the vitality of the community based on family
b: the vitality of business.

more noticeable, even if there are merits. Just as freedom versus equalization go beyond the framework of modern nations, or exist despite them, Philanthropy is more indispensable.

Therefore, by earnestly reforming attitudes towards life—from being slaves of mass production and waste to coming to lead simple and austere lives ourselves—we must aim at being thrifty and industrious, and so realize self-innovation and social justice by ourselves as life-innovators and groups of life-innovators. Then an "inner-check" is required. While Japan is a nation which is dependent on the talents and abilities of its people, it is required that Japan should have a kind of national "Grants" plan, and become an economically cooperating major power based on global brotherly love. (See Figure 6).

In order to do so, an inner-revolution is indispensable. Compare this with Mortimer Adler, *The Time of Our Lives*, p. 225. "Instead of free time being used for the pursuits of leisure and *deeply silent meditation*,

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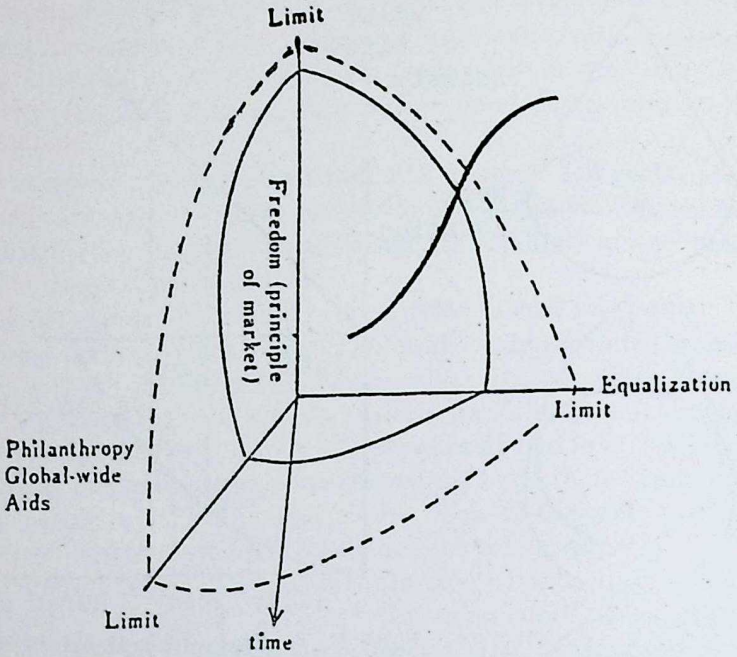

Figure 6. Freedom vs Equalization vs Philanthropy.

through which a human being develops as a person and grows mentally, morally and spiritually, it is used in the pursuits of consumption and waste, as well as in the pursuits of production, of commodities and services of questionable and dirty values, and for over-indulgence in frivolous activities that make little or no contribution to bettering our lives. To change this pattern of life calls for a moral revolution, which precedes ahead of the times, and leads to an economic revolution." (Supplement supplied.)

Beyond the old-fashioned, materialistic, upward-symbol-oriented models—in the other words, the logic of capital which sticks to "productive industry" embodying the idea of "catch up and go ahead", and the theory that the nature of man is evil, which obstinately maintains class conflicts—the inner-oriented model would take the place of the expansion-oriented model that only extends outwards.

The theory that the primary corporate objective is the maximization of profits is an erroneous one. This is because humanization is concealed by physical desires and impatience. Exaggerating a part of the subjectivity of man results in the spread of antisocial behaviour. If J. M. Keynes' statement is true that practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist, I cannot help admitting that the views of the former

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traditional economists are responsible for their dirty and worse societies. So long as we don't reflect the above-mentioned requirements for thrift and austerity, and wants for infinite expansion are only considered as a basic assumption of economics, these economists will not be the prime contributors to the future development of the era. Because frankly speaking, the abundant and open circumstances have been increasingly limited by objective factors. So I think it will be advisable to diversify the objectives of business and work to include such items as "more meaningful life and work", and "the pleasure of volunteering". Otherwise, business corporations will be forced to do so.

Instead of "Wants and Profit-earning" which are assumptions of traditional economics, if the exchangeable factors of collectivism in an extensive sense (including globalism), the spirits of thrift and austerity, and the ideas of "worth living" and "worth working", are at least embraced, the substance of economics seems to change qualitatively. Beyond the traditional theories (including modern economics and Marxian economics) based on the atomistic multiplication of wants and materialistic egoism, the revolutionizing of a consciousness of justification as faith in theories may offer the only real solution to the problems.

Keynesian economics has played an important part in the revolution of this faith in theories. It succeeded in opening up a new field on the demand side by approving the downward rigidity of wages and inspiring a new wind in effective demand. But, as the Keynesian theory was dependent on modern nationality (to say the least, Keynesian economics doesn't prove the governmental defaults that are degenerating into whimsicality and inefficiency), it has been leading to the evils of "Big Government". Virtually, today's government is not a philosopher's one. It betrays weakness to pressure groups and is a sort of mobocracy which is expensive. In the long term, however, it is a wave of parliamentary democracy, which can rely on the wisdom of life-innovators.

Therefore, we can't return to "the logic of productivity" before Keynesian economics under the slogan of "American recovery". We should not go against the times. We have to reflect on what a human being should be, including human wants and their satisfactions which maintain both productivity and effective demand. Furthermore, the reconsideration of a total eco-system in itself, which includes a variety of factors, will be inevitable.

Thus, this study shows us that life-innovators will create a fascinating new potential power in the very midst of crisis. It is understood here that we can now find the important meanings in Eastern Philosophies especially in Buddhism, which has been virtually neglected up to now in spite of being an Origin of the Japanese spirit.

After the war free economy was revived at least superficially in Japan.

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And a national consensus on this was formed easily. Since the Japanese people were trained not to be disobedient, they could easily form a concensus, in many cases, if only they could be let known the intention of the ruling class. Therefore, the "planned economy" advocated by post-war cabinets was easily approved, although it had no compelling power. And the Japanese people cooperated for its realization. If we can call the prewar Japanese system a partially democratic and partially fascistic one, we can call the postwar Japanese economy a "democratic planned economy" or "liberalistic controlled economy." In all cases, the Japanese succeeded in grafting modern economy which had prospered in Western Europe (under the rational religion aimed at relieving individuals) into the special economy with industries based on modern science and technology and on the religion aimed at defending the ruling class.

In the above mentioned "liberalistic controlled society" such a system brought about the great material success. But in such a system, which presupposes lack of ideologies that criticize or rebel against the existing ruling class, individualism, liberalism or internationalism could not prosper. The Japanese people are a strong believer in the importance of race. They are kind to their fellow countrymen, but are unkind to foreigners (except fellow white) and outsiders of the group.

Now, I will attempt to show an antithesis against the classical economics and Keynesian economics. (See Figure 7.)

To begin with, look at the change in the demand curve or D_1D', In "The General Theory", J. M. Keynes admits the supply curve which shows marginal productivity, but corrects the demand curve. If a new point of unemployment is presented by $D_2.S$, involuntary employment is obliged to occur between the point of unemployment and the point of full employment mentioned in the classical school. Moreover, in this figure, excess demand, shown by $e_2 . e_2'$, creates a sort of inflationary gap. For example, if the opportunity arises, prices will soar like prices of oil. It has an indispensable necessity to consider the bottom-up movement of life-innovators and inflationary adjustment from a worldwide viewpoint.

Nevertheless, if the superfluous flesh of effective demand is reduced in advanced countries as leaders (in the case of oil, thriftiness and austerity by effective use or the development of alternative energy sources, have been eliminating waste.), as the curve of D_3 or D_4 shows, the inflationary gap will disappear. Moreover, in the long term, the downward rigidity of the demand curve will gradually be broken down. Because stagnation is still firm, inflation has been running wild, and living values have been maintained by the principles of thrift and industriousness.

If the superfluous flesh of effective demand is reduced and productivity can be maintained by industriousness at the same time, the supply curve will also be maintained.

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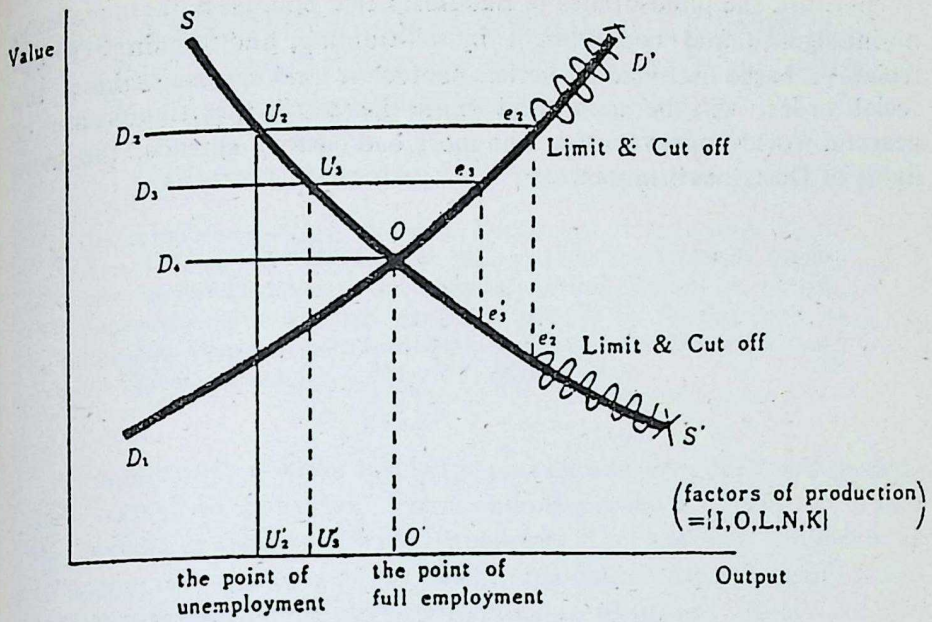

Figure 7. Re-devised Demand and Supply based on the Principles of Industriousness and Thrift beyond the Classic and the Keynesian Theories.

Note: In the ordinary case, the supply curve rises upward to the right, and the demand curve falls downward. But in the mass-production society, in which all resources are limited, there is a tendency of decreasing marginal productivity, and the more production proceeds, the less the value decreases. On the other hand, however, it is to be said that there are boundlessly abundant wants and demands in the conditions of infinitely inflationary tendency, higher level-up movements of livelihood and bottom-up democracy in the global-wide viewpoint. And then the more demand proceeds, the more the value increases.

The limit and cut off in DD' . SS' depend on the law of Entropy based on the requirements of thrift and austerity.

$e_2.e_2'$, $e_3.e_3'$: Inflationary Gap caused by potential excess demand

I : Intelligence, O : Organization, L : Labour, N : Nature, K : Capital

For example, if K. E. Boulding's "know-how", or "Intelligence and Organization" (of which I have emphasized in my books, for these are especially significant factors in Japan) works an important function, which is possible because the principle of industriousness, totally it is more possible that a stabler, stationary-state economy will be created. In this case the important matter is to maintain employment qualities by means of "a human-scale technology" and time-sharing and so on.

Faced with all these situations, as Figure 7 shows, excess demand and excess supply, which are dependent on mass production, mass sale and mass consumption, are considered as superfluous flesh, and so will be inevitably cut off by self-control or forced regulation.

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In short, the philosophies of Buddhism that happiness lies in modesty, no-indulgence and contentment by self-training, and teachings of Confucianism based on avoiding useless confusion and so maintaining the social order, will be more and more increased the significance of peaceful world-improvements. The more bad custom spreads, the more lights of Doctrines brighten.

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ANALYSIS OF NATURAL RESOURCE PROBLEMS USING A SYNTHESIS OF NEOCLASSICAL AND INSTITUTIONAL ECONOMICS

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A number of economists during the past decade have dealt with various issues related to individual institutional behaviour and property rights. Among these writers, some have emphasized the age old criticisms of neoclassical economics and the need to maintain a separation of institutional economics from mainstream economics. However, others see the possibility of a synthesis of mainstream and institutional economics whereby neoclassical economics is greatly enhanced. An institutional-mainstream synthesis seems appropriate in order to produce a superior, informative and humanized economic formulation. Several institutionalists see opportunities for a synthesis of John R. Commons' ideas with the mainstream approach.[1] A recent work by Allan A. Schmid is an excellent milestone attempt in this direction.[2] Schmid, through careful analysis, derives many testable hypotheses which not only complement mainstream

[1]See K. E. Boulding, "A New Look at Institutionalism," *American Economic Review* 47 (May 1957): 1–12; V. Goldberg, "Commons, Clark and the Emerging Post-Coasian Law and Economics," *Journal of Economic Issues* 10 (December 1976): 877–93; R. A. Gonce, "John R. Commons' Legal Economic Theory", *Journal of Economic Issues* 5 (September 1971): 80–95; R. A. Gonce, "The New Property Rights Approach and Commons' Legal Foundations of Capitalism," *Journal of Economic Issues* 10 (December 1976): 765–97; A. G. Grunchy, *Contemporary Economic Thought: The Contribution of Neo-Classical Economics* (Clifton: Augustus M. Kelly, 1972); H.H. Leibhafsky, "Commons and Clark on Law and Economics," *Journal of Economic Issues* 10 (December 1976): 751–64; V. Ostrom, "John R. Commons' Foundations for Policy Analysis," *Journal of Economic Issues* 10 (December 1976): 839–857; and A. Randall, "Property Intitutions and Economic Behaviour," *Journal of Economic Issues* 12 (March 1978): 1–21. Among the various works of John R. Commons, the following are of particular interest here: *Legal Foundations of Capitalism* (New York: MacMillan Company, 1924); "Institutional Economics," *American Economic Review* 21 (December 1931): 649–57; *Institutional Economics* (New York: MacMillan Company, 1934); and *The Economics of Collective Action* (New York: MacMillan Company, 1950).

[2]A. A. Schmid, *Property, Power and Public Choice: An Inquiry into Law and Economics* (New York: Praeger, 1978).

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economics, but provide superior economic formulations to existing mainstream frameworks in the area of property, power and public choice.[3]

The approach to be used in the present study is similar to that of Schmid's, but the major framework comes from Commons' foundations of policy analysis.[4] The focus here is on the manner in which a particular institution or set of institutions (working rules) affects individual freedom, securities, rights and individual views of efficiency, output and equality which dominate when individuals' interests are in conflict in an interdependent situation. The intellectual foundations upon which logical inferences can be applied to a complex problem such as soil erosion in which private rights, efficiency, equity, resource use rates and human interaction are woven in an interdependent world. This foundation lies with Commons' legal and economic concept.[5]

I. Roots of Institutional Economics

The institutional approach to study economic problems originates from the works of R. T. Ely and is associated with the seminal and path-breaking works of Commons and other more recent scholars in that tradition who are extending mainly the basic works of T. B. Veblen, Commons and W. C. Mitchell.[6] All of these economists have been grouped

[3]D.K. Marothia, "An Economic and Institutional Analysis of Soil Erosion on Agricultural Land." Unpublished Ph.D. dissertation (The University of Alberta, Edmonton, 1981).

[4]*Ibid.*

[5]*Ibid.*

[6]The works of R. T. Ely include: *An Introduction of Political Economy* (New York: Eaton and Mains, 1889); and *Property and Contract* (New York: MacMillan Company, 1914). Other works of J. R. Commons not cited above include: *Reasonable Value* (Ann Arbor, Michigan; Edwards, 1925): *Myself* (New York: MacMillan Company, 1934); and *A Sociological View of Sovereignty* (*1899–1900*) (New York: Kelley, 1965). Reference is made here to the following works by T. B. Veblen: *The Theory of Business Enterprise* (New York: Charles Scribner and Sons, 1904); and *The Place of Sciencc in Modern Civilization* (New York: B.W. Huebsh, 1919); and to the following works by W. C. Mitchell: *Business Cycles* (Berkeley: University of California Press, 1913); and *The Backward Art of Spending Money* (New York: McGraw Hill Book Company, Inc., 1937). The works of other scholars include: J. A. Hobson, *The Social Problem* (London: J. Nisbet, 1901); M. G. Ranade, *Essays in Indian Economics*, 3rd Ed. (Madras: G. A. Natesan and Company, 1920); R. G. Tugwell, "Human Nature in Economic Theory," *Journal of Political Economy* 30 (June 1922): 317–345; R. G. Tugwell, "Experimental Economics," *The Trend of Economics* (New York: A. A. Knopf, 1924); J. M. Clark, *Studies in the Economics of Overheads Costs* (Chicago: University of Chicago Press, 1923); J. M. Clark, *Social Control of Business* (New York: McGraw Hill Book Co., 1939); J. M. Clark, *Economic Institutions and Human Welfare* (New York: Alfred A. Knopf, 1957); W. Sombert, "Economic Theory and Economic History," *The Economic History Review* 2 (January 1920): 1–19; A. Lowe, *Economics and Sociology* (London: G. Allen and Unwin, Ltd. 1935); C. E. Ayres, *The Problem of Economic Order* (New

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as institutionalists, neoinstitutionalists, heterodox economists or neoinstitutionalist-heterodox economists. For example, Gruchy labels the works of Ayres, Galbraith, Lowe and Myrdal as "neoinstitutional economics" to distinguish them from the "old institutional economics" works of Veblen, Commons and Mitchell; whereas Randall groups those economists who have antecedents in institutionalists thought, but also work within a neoclassical framework into a school known as "neoinstitutionals". Landreth groups most of the above mentioned economists as dissidents from orthodox economics—"one unquestionably common element".[7] The combined group following Landreth is referred to herein as institutional economists due to their broad approach in dealing with practical and political problems in an effective way.[8]

York: Farrar and Rinehart, 1938); C. E. Ayres, *The Theory of Economic Progress* (Chapel Hill: University of North Carolina Press, 1944); C. E. Ayres, *Towards a Reasonable Society* (Austin: University of Texas Press, 1961); G. C. Means, "Business Combinations and Agriculture," *Journal of Farm Economics* 20 (February 1938): 53–57; K.H. Parson, "Social Conflict and Agricultural Programmes," *Journal of Farm Economics* 23 (November 1941): 743–764; K. H. Parson, "John R. Commons' Point of View," *Journal of Land and Public Utility Economics* 18 (August 1942): 245–66; R. Mukerjee, *The Institutional Theory of Economics* (London: MacMillan and Co. Ltd., 1942); A. G. Grunchy, *Modern Economic Thought: The American Contribution* (New York, Prentice-Hall, 1947); A. G. Grunchy, *Contemporary Economic Thought op. cit.*; S. V. Ciriacy-Wantrup, *Resource Conservation: Economics and Policies* (Berkeley: University of California Press, 1952); G. Colm, "Economics Today", *Essays in Public Finance and Fiscal Policy* (New York: Oxford Press, 1955); J. Dorfman, "The Role of the German Historical School in American Economic Thought." *American Economic Review* 45 (May 1955): 17–28; J. Dorfman, "Commons, John R.," In *International Encyclopedia of the Social Science*, Edited by D.L. Sills, Vol. 3 (New York: MacMillan and Free Press, 1968): 22–24; K. E. Boulding, *op. cit.*; J. K. Galbraith, *The Affluent Society* (London: MacMillan, 1958); J. K. Galbraith, *The New Industrial State* (Boston: Houghton Mifflin Co. 1971); J. K. Galbraith, *The Economics and the Public Purpose* (Boston: Houghton Mifflin Co., 1973); G. Myrdal, *Value in Social Theory* (London: Routledge and Kegan Paul, Ltd., 1958); G. Myrdal, *Beyond the Welfare State* (New Haven: Yale University Press, 1960); G. Myrdal, "Institutional Economics," *Journal of Economic Issues* 12 (March 1978); 1–14; S. Kuznets, *Institutional Economics: Veblen, Commons and Mitchell Reconsidered* (Berkeley: University of California Press, 1963); R. A. Gonce, *op. cit.*; W. Samuels, "Welfare Economics, Power, and Property," In *Perspective on Property* Edited by G. Wunderlich and W. L. Gibson (University Park: Pennsylvania State University Press, 1972): 20–32; D. W. Bromley, "Economics and Public Decisions: Roles of the State and Issues of Economic Evaluation," *Journal of Economic Issues* 10 (December 1976): 811–38; V. Goldberg, *op. cit.*; M. M. Kelso, "Natural Resource Economics: The Upsetting Discipline," *American Journal of Agricultural Economics* 59 (December 1977): 814–23; A. A. Schmid, *op. cit.*, and A. Randall, *op. cit.*

[7]H. Landretg, *History of Economic Theory* (Boston: Houghton Mifflin Co., 1976): p. 319.

[8]D. K. Marothia, *op. cit.*

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Among the above mentioned economists, the focus is on Commons and on the transmission of his thoughts reflected in institutional economics research in the last four decades. Commons brought institutional economics to us and applied its concepts to agricultural problems. If one examines the work of many resource and agricultural economists, one may see the reflections of Commons' thoughts in their writings—in some cases being merely an extension of Commons' work and in other cases being an improvement.[9] However, no major attempt has been made to date to interpret Commons' work and link it to mainstream economics. As Boulding concluded, Commons' "theoretical structure remains today exactly where he left it, a tangled jungle of profound insights, culled by an essentially non-theoretical mind from a life rich with experience of economic realities. No disciple has taken it up or even ventured to interpret it for the lay public..., Commons gathers dust on the shelves".[10]

The purpose here is not to extend or modify Commons' legal economic theory[11] and institutionalism;[12] neither is it to provide guidelines to analyze the encyclopaedia of Commons' "tangled jungle of profound insights", nor to respond to the naive question of Seckler[13] who asked, "does Commons have any economic theory aside from his ideas about social reform ?"[14] Rather, it is merely an attempt to interpret a few ideas of Commons' institutional and legal theories and to show their capability to deal with the challenging problems in natural resource economics. Much of the current work related to public policy is overly concerned with marginal analysis and/or abstract theoretical models, and suffers from a failure to make use of a broader approach to deal with comlexities in such problems as soil erosion and agricultural pollution. By making use of the

[9]For example, Commons' ideas have influenced those researchers who work with the structure-conduct-performance paradigm and labour and international development problems (Randall, *op. cit.*, p. 5).

[10]K. E. Boulding, *op. cit.*, p. 8.

[11]Commons' legal eeonomic theory comes from the following works: *The Distribution of Wealth* (New York: The MacMillan Company, 1893); *Proportional Representation*, 2nd Ed. (New York: The MacMillan Company, 1907); and *Legal Foundations of Capitalism* (New York: MacMillan Company, 1924).

[12]Commons' institutionalism comes from the following works: "Institutional Economics," *American Economic Review* 21 (December 1931): 649–57; *Institutional Economics* (New York: MacMillan Company, 1934); *Myself* (New York: MacMillan Company, 1934); and *The Economics of Collective Action* (New York: MacMillan Company, 1950).

[13]D. Seckler, "The Naivete of John R. Commons," *The Western Economic Journal* 4 (Summer 1966), p. 261.

[14]For an excellent exposition of Commons' legal and economic theories see Boulding, Gonce, Grunchy, Kuznets, Ostrom, Parson and Goldberg as referenced above. Also see D. Kanel, "Property and Economic Power vs Issues in Institutional Economics," *Journal of Economic Issues* 8 (December 1974): 827–40.

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basic principles of policy analysis which Commons developed a half century ago in his monumenal, *Legal Fonndations of Capitalism*, *Institutional Economics*, and *Economics of Collective Action*, an improvement in the current state of neoclassical theory can be anticipated. The resulting framework can then be utilized to deal with the challenging problems in natural resource economics and other areas of economics.[15]

II. Determinants of Commons' Policy Analysis

Commons' framework of policy analysis emerges from a background of evolutionism that includes such writers as Comte, Marx, Ward, Ross, and the German historical school.[16] Commons' foundation of economic theory, which stems from evolutionary sociological theory and theory of law, is basic to an understanding of how he developed the basic determinants of policy analysis. As opposed to classical, Austrian and neoclassical economists who saw a harmony of interest arising through voluntary exchange from the interactions of independent and entirely selfish individuals, Commons saw conflict as the predominant economic phenomenon working from a more complex concept of human motivation and social organization. Commons' policy analysis starts with man and attempts to substitute man's static, individualistic psychology with an evolutionary social psychology. Commons hypothesized that man is a creature of his environment, an evolutionary product of the struggle to survive by producing and consuming material goods and services.[17] Commons' conception of man, that he is "static, self-interested, purposive, stupid, capricious, ravenous for power, and oppressive unless his will is coerced", leads him to reject the traditional doctrine of natural harmony of interests and makes conflict one of his cardinal tenets.[18]

According to Commons, security, liberty and equality are the three most fundamental social conditions individuals want in a society in order to pursue self-realization.[19] These conditions exist because "man craves security for his expectations and could not act at all as a rational being without the feeling of security".[20] Commons assumes that material scarcity exists. In the face of material scarcity, self-interest breeds conflict and disorders, and conflicts of interest, in turn, then ruin the social conditions.[21] Impelled by material scarcity and conflicts of interest, man insists on

[15]D. K. Marothia, *op. cit.*

[16]R. A. Gonce, "John R. Commons' Legal Economic Theory," *Journal of Economic Issues* 5 (September 1971), p. 83.

[17]J. R. Commons, *A Sociological View of Sovereignty (1899–1900)* (New York: Kelley, 1965), pp. 7, 18 and 35.

[18]J. R. Commons, *Institutional Economics*, pp. 682, 702, 705, 743 and 874.

[19]*Ibid.*, p. 706.

[20]J. R. Commons, *Legal Foundations of Capitalism*, p. 364.

[21]J. R. Commons, *Myself*, pp. 97 and 98.

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private ownership, which is a person-to-person relationship with respect to property and is based on coercion. Social classes appear among individuals with similar ownership patterns and who collectively pursue common interests. Private ownership does not suppress conflicts of interest because class conflicts then emerge. In Commons' opinion, conflicts of interest breed unorganized and deliberately organized institutions to regulate human behaviour and to provide security, liberty and equality. Thus, institutions resolve conflicts of interest and produce institutionalized individuals, regulate behaviour and secure expectations.[22]

Commons defines intitutions as "collective action in control, liberation and expansion of individual action".[23] Institutions include laws, constitutions (i.e., "laws about making laws"), traditions, moral and ethical structures, and customary and accepted ways of doing things.[24] Principles of scarcity, efficiency, futurity and working rules of collective action are the common principles applied to unorganized custom as well as to organized going concerns.[25] Commons states that the term "working rules is appropriate to indicate the universal principle of cause, effect or purpose, common to all collective action. ...they indicate what individuals can, must, or may or may not do, enforced by collective sanctions".[26] Thus. institutions express a society's value system and give it effect in the form of working rules. In other words, institutions or working rules order the relationship among individuals within society.

Taking a clue from Hume, analysis of Commons' collective sanctions provides a correlation among economics, jurisprudence and ethics which is prerequisite to an institutional approach. Commons asserted that "ethics deal with the rules of conduct arising from conflict of interests, arising, in turn, from scarcity and enforced by the moral sanctions of collective economic sanctions of profit or loss in cases of obedience or disobedience, in which jurisprudence deals with the same rules enforced by the organized sanctions of violence".[27] But the principle of collective action is more universal in the unorganized than in the organized form of institutions. Unorganized institutions include ethical beliefs and customs and these are man's response to changing conditions of scarcity and conflicts of interest. In Commons' view, while unorganized institutions influence human behaviour, they do not exert sufficiently strong sanctions to be deterministic of human behaviour. Commons believes that organized going concerns can induce human behaviour and therefore he develops his analysis upon such concerns. Organized institutions emerge in order

[22]R. A. Gonce, *op. cit.*, p. 84.
[23]J. R. Commons, "Institutional Economics," p. 649.
[24]J. R. Commons, *Legal Foundations of Capitalism*, p. 124.
[25]J. R. Commons, "Institutional Economics," p. 650.
[26]*Ibid.*, p. 650.
[27]*Ibid.*, p. 650.

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to resolve conflicts of interest of many individuals with diverse interests and preferences. To maintain a coordinated flow of action and transactions in the conduct of any going concern, society adopts working rules which define person-to-person relations with respect to property.[28]

Working rules are arrangements for interdependent decision-making in reciprocal and joint efforts and they enable each individual to relate himself to others in productive efforts. The capacity of individuals to form stable expectations about the behaviour of others by knowing the working rules is a basic condition for the function of any organized going concern. That which Commons calls the principle of working rules is critical to form social relationships and to the choice of alternative policies.[29] The basic unit of individual actions is the transaction which involves alienation and aquisition to rights of property and liberty created by society and which therefore must be negotiated between parties concerned before production, consumption and exchange can take place.[30] By establishing and enforcing working rules, the institutional framework makes the transaction feasible by providing the parties with reasonably sure expectations of performance. By enforcing working rules in which institutions limit and control man in his pursuit of his self-interests, two effects are produced, man creates institutions and institutions tend to shape man by influencing his patterns of thought, behaviour and expectations as he reacts to them; and working rules establish a network of social relations specifying agreement about everything with everyone. This network gives form to the structure of society, provides an individual with some secure rights and places some limitations on the actions of others which might impinge upon him.[31] In treating the concept of working rules. Commons recognizes that an institutional approach must make an analysis of the behaviour of individuals while they are participating in transactions.[32] Drawing from the ideas of Hohfeld, Commons devised a scheme which the analysis of working rules enforced by all types of institutions. This article is now directed to Commons' schema of relations.[33]

III. Commons' Schema of Individual Relations

Commons' concept of working rules is a major contribution to policy analysis. Working from the ideas of Hohfeld, Commons believed that

[28]R. A. Gonce, *op. cit.*, pp. 84 and 85.

[29]V. Ostrom, "John R. Commons' Foundations for Policy Analysis," *Journal of Economic Issues* 10 (December 1976), p. 841.

[30]J. R. Commons, "Institutional Economics," p. 652.

[31]R. A. Gonce, *op. cit.*, p. 85; and A. Randall, "Property Institutions and Economic Behaviour," *Journal of Economic Issues* 12 (March 1978), p. 4.

[32]J. R. Commons, *op. cit.*, p. 654.

[33]W. H. Hofield, "Some Fundamental Legal Conceptions as Applied in Judicial Reasoning," *Yale Law Journal* 23 (April 1913): pp. 16–59.

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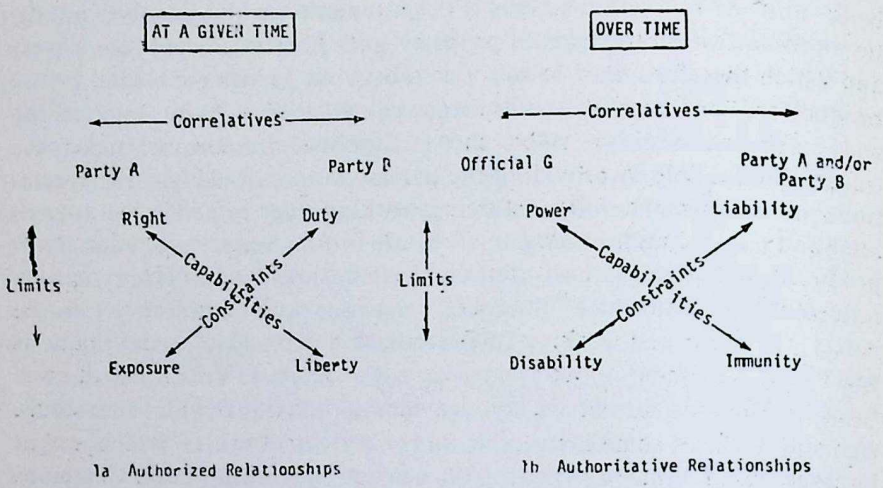
person-to-person relations with respect to scarce goods or property can be analyzed in terms of any or all of eight fundamental relations in the definitional scheme shown in Figure 1. Although the basic eight legal terms were given by Commons[34] Ostrom[35] added the diagonal characterization to indicate that the general structure of authorized and authoritative relationships has reference to both capabilities and constraints. Commons' and Ostrom's explanations are combined in Figure 1 for a better exposition of the working rules.

FIGURE 1

COMMONS' SCHEMA OF RELATIONS



1a Authorized Relationships 1b Authoritative Relationships

In establishing the concept of working rules, Commons used "words as symbols". He recognized that the systematic arrangements in the formulation of words, determining their application and enforcing relationships in accordance with working rules are imperative if words are to work in ordering human relationships in characterizing the working rules of organized going concerns, Commons distinguished "authorized transactions" from "authoritative transactions".[36] The former allocates authority to determine, enforce and alter authority relationships.[37] According to Commons, each term has a separate meaning in the two sets of relationships and is related to other terms by way of jural correlatives and limits.[38] The terms in Figure 1a apply at a given time in the case of authorized transactions. The terms in Figure 1b apply in a changing

[34]J.R. Cnmmons, *Legal Foundations of Capitalism*, pp. 84, 85, 87, 96, 116 and 131.
[35]V. Ostrom, *op. cit.*, p. 843 and 844.
[36]J.R. Commons, *op. cit.*, p. 532.
[37]V. Ostrom, *op. cit.*, p. 842.
[38]J.R. Commons, *op. cit.*, p. 87.

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situation in the case of authoritative transactions. Both sets together present a more general structure of Commons' schema. Ostrom added the diagonal characteristics to indicate that the general structure of authorized and authoritative relationships have reference both to capabilities and constraints.[39] Ostrom emphasized the addition of diagonal characteristics as "it is in this sense that legislation is the proportioning of inducements by assigning capabilities and constraints to individuals for making decisions in relation to those who occupy interdependent positions and engage in transactions with one another".[40]

In Figure 1a, the leading term is "right", and it correlates with another person's or party's duty. A "specified right" of party A to act imposes a duty on party B to act in accordance with the right being asserted. However, rights and duties are subject to limits.[41] The limit of A's right is his "exposure", which provides a "liberty" for B. Thus, A's degree of exposure subtracts from his rights; B's liberty subtracts from his duty. Exposures and liberties are correlative in the same sense as rights and duties. The sum of A's rights and exposures equals the duties and liberties of others.

Authorized relations (Figure 1a) depend upon authoritative relations because words themselves are not self-formulating, self-determining or self-enforcing. Authoritative relations involve authority to determine, enforce, and alter legal relationships. These are relationships that are identified with government institutional arrangements in society at large. Power is the principle leading term in Figure 1b and defines the authority to determine, enforce, and alter legal relationships. Officials (G) have powers which place liabilities on citizens (party A and/or party B). The limit of liability is immunity, and the immunity of a citizen provides a disability for the official by limiting his power. None of the eight terms is absolute or infinite; each has its limits as well as its correlatives.

The relationship between two sets of relationships, those between private citizens (authorized relations) and those between private citizens and the state (authoritative relations) are correlative and equivalent in the sense that when the relations between citizens and officials are determined, this determines also the relations among citizens.[42] The very basic assumption is that a right depends upon the availability of remedies to procure enforcement or imposition of sanctions for the failure of a person under duty to perform in accordance with that duty. Futhermore, the assumption correlates two sets of relationships when a person making

[39] V. Ostrom, *op. cit.*, p. 843.
[40] *Ibid.*, p. 843.
[41] J. R. Commons, *op. cit.*, pp. 84 and 85.
[42] *Ibid.*, pp. 123–124.

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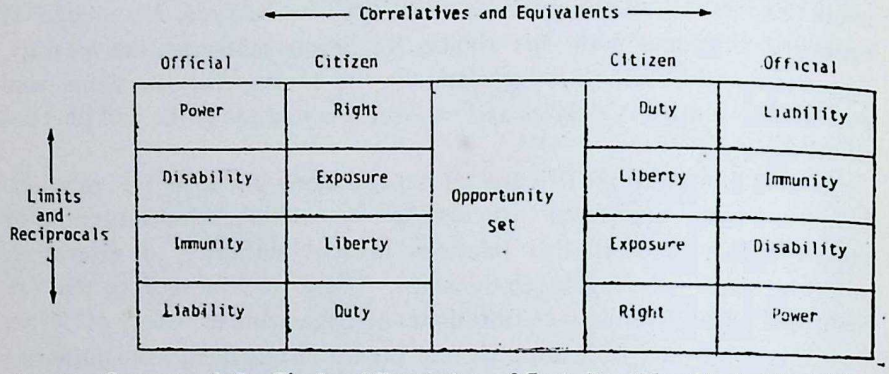
a claim to a right fails to procure authoritative remedies to enforce that right; the person then stands exposed. Rights in the structure of authorized relationships thus depend upon an equivalent access to power in the structure of authoritative relationships.[43]

Power of individuals which determine the limit of property and liberty, including the limits of defining and enforcing contracts, are the means by which individuals may free themselves of liabilities. It is this concept that Commons uses to represent a complete scheme of legal correlatives, equivalents, limits and reciprocals accompanying every transactions.[44] This concept is reproduced in Figure 2. Commons refers

FIGURE 2

COMMONS' SCHEMA OF AUTHORITY RELATIONSHIPS



Source: Commons, J. R., *The Legal Foundations of Capitalism* (New York: MacMillan, 1914), p. 124.

to this conceptual apparatus as a "scheme of words and definitions" or a "kind of mental compass" which may be used in understanding the patterns of interdependencies that arise from structures of institutional arrangements.[45] Commons, in structuring this scheme of authority relationships, considered the "behaviour" to which the "reasoning" is applied. The rational relations existing between legal and economic ideas are also considered. Commons believed that his rationalizing scheme, which is a combination of authorized and authoritative relations, has "universal" application.[46]

Commons' mechanism of relationships is examined in the context of a soil erosion problem.[47] The leading terms in Figure 2 are power and

[43] V. Ostrom, *op. cit.*, p. 845.
[44] J. R. Commons, *op. cit.*, p. 124.
[45] *Ibid.*, pp. 122 and 124. See also V. Ostrom, *op. cit.*, p. 845.
[46] *Ibid.*, pp. 47–129.
[47] *Ibid.*, pp. 124–134.

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duty. For example, it is the "duty" of an agricultural service officer to serve a written notice to farmer. A, who does not hold a license for water diversion, but nevertheless diverts water on to his neighbour's (farmer B) field. The agricultural service officer serves a written notice to farmer A upon hearing about the complaint from farmer B. In order to perform this "duty", the agricultural service officer carries with him the potential "power" of a government body such as an Agricultural Service Board. To represent the government, an agricultural service officer is treated as the government in action. The government is what its officials do (this representation is consistent with Commons' terminology, to represent the "state" or government, Commons treats officials as the "state-in-action"). An agricultural service officer's exercise of that "power" is "limited" at the point where official disability begins and to the extent that farmer A is legally "immuned". The official is also "liable" for neglect of "duty" or abuse of "power" in ensuring transactions with the Agricultural Service Board. This "liability" of the officer is also "limited" at the point where he can expect "immunity". To that extent an offender (farmer A) is legally "liable". These are but a few abstract relations that surround the agricultural service officer and farmer A, who may be guilty of an offence when they happen to come together.[48] But the actual relations between the agricultural service officer and farmer A is determined by the choice of alternatives which Commons called "discretion". The choice among alternatives is influenced by the "immunity", "liability" or "liberty" that exists and the result of actions taken.

Choice of alternatives helps officials "proportion the behaviour of citizens by offering inducements in the directions which they consider important and away from the directions which they reprobate".[49] The laws of the state determine the direction of opportunity sets and inducements for citizens. The choice of alternatives determines the limits of the substantive and remedial powers of individual rights in its collective activity, as well as in its limit of the physical power of the government. The substantive and remedial powers are equivalent, when the relations between citizens and officials are determined, the relations among citizens themselves are also determined.

[48]This example differs from a Coasian solution in that rights are subject to limits and working rules govern these rights in a Coasian case there are "givens" in competitive markets. For example, if farmer A is "liable", then A proceeds to direct water onto B's field, knowing that damages will be assessed by the agricultural service officer, and that he must pay farmer B for damages. Farmer B is protected by a "liability" rule. However, if farmer B is "liable", then farmer B must approach farmer A and pay not to have directed water in his field A Coasian solution assumes zero transaction cost and no income effect in this situation. However, an alternative arrangement of property rights can not be achieved at zero cost.

[49]J.R. Commons, *op. cit.*, p. 123.

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Thus, right and duty are assertions of one person's wishes against another person's wishes and which are guided by opinions of right and wrong. The distinction between ethical rights and duties and legal rights and duties is the distinction between two classes of probability respecting human conduct Commons recognizes that "Law, Ethics and Economics are a different aspect of the same science of probabilities of human behaviour. Law is a science of the probabilities of official transactions in the exercise of authorized physical coercion; Ethics is the science of the probabilities of both official and private transactions; while Economics is a science of the probabilities of official and private transactions in utilizing both human and natural resources for ethical, economic and *public purposes*" (emphasis added).[50] Without including the concept of human purpose and integration of the fields of law, ethics and economics, the establishment of an institutional approach cannot be accomplished. It is the concept of purpose that introduces the concept of "reciprocity into transactions". According to Commons, "reciprocity" is the official valuation of the virtues and vices of human beings".[51] The reciprocity is substracting in nature, for example, reciprocal duty is a substracting duty deducted from one's liberty and one's exposure is the reciprocal of one's own liberty.

In summary then, Commons' scheme of understanding the patterns of interdependencies that arise from structures of institutional arrangements (working rules). indicates that the concept of correlates and equivalents holds between structures of authorized relations and authoritative relations, and these relations underlie the notion of reciprocity, which is none other than the system of limited rights and duties.

IV. Commons' Institutionalism and Mainstream Economics Synthesis

Commons' institutionalism is the outcome of his grand success to convert his vision of law, ethics and economics into the systematic study of the creation, functioning and demise of institutions. Commons' concepts of "institutions", "going concerns", "working rules" and "transactions" provide an approach for a powerful analysis. Commons' institutions express a society's value system and give it effect in the form of working rules. As such, they tend to shape the individual's behaviour, actions and expectations. Man responds positively to institutions he views as ethically right and negatively to those he sees as ethically wrong. The day-to-day transactions of individuals and groups will proceed smoothly when institutions are in harmony and when that is not the case, defiance and perhaps social upheaval and insurrection will result. From this point of view the fundamental task of social science is to design new intitutions

[50] *Ibid.*, p. 127.
[51] *Ibid.*, p. 131.

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which must provide more effective avenues for transactions among individuals in order to resolve conflicts.[52]

Commons' institutionalism is full of profound insights. He has "tried to formulate an analysis which would give a foundation for the coordination of the social sciences, especially law, ethics, economics and political science".[53] Due to his uncompromising belief in evaluationism, rationalism and multiple causation, he proposes to treat all factors influencing transactions as endogenous interdependent variables. For this reason, according to mainstream economists, Commons' model is not especially amendable to the production of testable hypothesis. Commons responds to this criticism in two ways. He proposes that, "indeed, a science is not a body of knowledge—it is just a method of investigation, and its theory is its method."[54] On the basis of this proposition, he argues that the meaning of economic science must lie in its procedure (method), rather than in its substance (theory). Secondly, he proposed a scheme to regulate economic behaviour which is a function of five groups of interdependent variables: futurity, scarcity, efficiency, custom and sovereignty.[55] As Randall comments, "Commons' system was a detailed, and in many ways, valid description of the real world. As a model, it failed to find favour with mainstream economists, not because it was wrong—it wasn't—but because it was not well adopted to the analytical technology of the economists of its day, geometry, algebra, and calculus."[56] Commons suggested that his institutionalism is in no way an alternative to mainstream economics, but should be treated as a complement in order to produce a better economic framework.[57] For example he proposes to use empiricism. multivariate analysis, and statistical techniques to investigate the relevant variables and formulate them into economic theory.[58] There could be no clearer evidence of Commons' ideas about his institutionalism and mainstream synthesis. The failure of the mainstream economists to understand this aspect seriously undermines Commons' analysis.

If mainstream economics can complement Commons' institutionalism,

[52]See, for example, the following: R. H. Day, "Orthodox Economists and Existential Economics," *Journal of Economic Issues* 9 (June 1975), p. 235; R. A. Gonce, "The New Property Rights Approach and Commons' Legal Foundations of Capitalism," *Journan of Economic Issues* 10 (December 1976), p. 778; and a Randall, *op. cit.*, p. 12.

[53]K. H. Parson, "John R. Commons' Point of View," p. 260.

[54]J. R. Commons, *Institutional Economics*, p. 722.

[55]*Ibid.* pp. 77, 719–748.

[56]A. Randall, "Contemporary Issues in Natural Resource Economics Discussion," *Americal Journal of Agricultural Economics* 60 (May 1978), p. 286.

[57]J.R. Commons' "Institutional Economics," p. 648.

[58]R.A. Gonce, "John R. Commons' Legal Economic Theory," p. 88; and A.G. Gruchy, "John R. Commons' Concept of Twentieth-Century Economics," *Journal of Political Economy* 48 (December 1940): 823–849.

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the resulting product would be distinguishable from, and superior to, existing neoclassical formulation. Over the course of the last to decades or so, scholars who identified with institutional economics, public choice and social choice theory, political theory, property rights and environmental economics have been generating a substantial volume of literature with logical implications following various ideas contained in Commons' *Legal Foundations of Capitalism*, *Institutional Economics* and *Economics of Collective Action*. For example, the logic of constitutional choice developed by Ostrom provides a conceptual apparatus and terminology that complements Commons' idea of correlates and equivalents which hold between structures of authorized relations and authoritative relations.[59] With Commons' basic idea that it is individuals who reach decisions about the rules that apply to decisions in a collectivity, Ostrom constructed the general theory of constitutional choice. Commons' ideas were most influential among the economists who work with the structure-conduct-performance paradigm. These economists related only Commons' ideas of human behaviour and working rules to the paradigm. Schmid, Seitz and Spitze, and Sharp and Bromley undertook this task but they (except for Schmid), developed their analyses around the structure-conduct-behaviour model only.[60] Commons sought to develop a synthesis of institutionalism-mainstream economics which would result in a system of institutional analysis capable of conceptualizing the pursuit of strategies in concurrent structures. This focus is the kind of analysis used herein to analyze soil erosion problems.[61]

V. Applicability of the Synthesis to a Natural Resource Problem

In order to analyze natural resources problems within Commons' conceptual framework. it is important to view the applicability of determinants of Commons, policy analysis to these natural resource problems. For the purpose of this article, the soil erosion problem in a Canadian context is used. Water induced soil erosion is recognized in every pro-

[59]V. Ostrom, *The Political Theory of a Compound Republic: A Reconstruction of the Logical Foundations of American Democracy as Presented in the Federalist* (Blacksburg, Va: Virginia Polytechnic Institute, Center for Study of Public Choice, 1971).

[60]A.A. Schmid, "Analytical Institutional Economics: Challenging Problems in the Economics of Resources for a New Environment," *American Journal of Agricultural Economics* 54 (December 1972): 893–901; A.A. Schmid, *Property, Power and Public Choice: An Inquiry into Law and Economics*; W.D. Seitz and R.G.F. Spitze, "Soil Erosion Control Polices: Institutional Alternatives and Costs," *Journal of Soil and Water Conservation* 23 (May-June 1978): 118–125; and B.M.H. Sharp and D.W. Bromley, "Agricultural Pollution: The Economics of Coordination," *American Journal of Agricultural Economics* 61 (November 1979): 591–600.

[61]D.K. Marothia, *op. cit.*

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vince of Canada.[62] Water induced soil erosion has been identified as a serious problem in the Peace River region of Alberta. Furthermore, it is directly related to the current farming practices and farm operators, perceptions.[63]

Growing recognition of the conflict between increasing demand for food production and soil loss prompts the suspicion that traditional notions of landownership and uses may not be adequate to meet current challenges. Freedom, historically attached to the private ownership of land, seems to come more and more at the expense of social good in a highly mechanized and capital intensive farming industry. Soil losses from water induced erosion in the region may be attributed to soil characteristics, farmers' perceptions of current soil use, farming practices and existing soil erosion control policies. The farm level damages associated with soil erosion include loss of productive soil, crop productivity, as well as temporal and spatial damages. The nature of private landownership does not take into account society's values. Existing government soil erosion policies and programs are corrective (rather than preventative) in nature, time-consuming insufficiently effective and unable to alter individual behaviour sufficiently to mitigate erosion.[64] Also, the current institutional arrangements do not include a wide ranging opportunity set to induce altered farm operator behaviour. The central issue then becomes one of determining a set of institutional arrangements which influence individual farmer behaviour as well as government agency behaviour.

As Commons' proposed, since "the behaviour in question is none than the behaviour of individuals while participating in transactions, institutional economics must make an analysis of the economic behaviour of individuals".[65] The loss of productive scarce soil in the Peace River region is the result of "static" and "self-interest" behaviour by farm operators who enjoy the liberty of private landownership. Self-interest behaviour coupled with private landownership creates conflict and disorder among farm operators, among farm operators and non-operators and between present and future generations. Alternative institutional arrangements or modifications of existing institutional arrangements may resolve spatial and temporal conflicts and produce institutionalized individuals and

[62] *Ibid.*, p. 1.

[63] W. E. Philips, D. DePape and L. R. Brook, *Water Induced Erosion on Privately Owned Agricultural Lands in the Peace River Region: An Institutional and Legislative Analysis*, Information Bulletin No. 2 (Edmonton: Environment Conservation Authority. October 1975); and Environment Conservation Authority, *Erosion of Land in Northwestern Alberta: Reports and Recommendations*; Information Bulletin No. 11 (Edmonton: ECA, November 1976).

[64] W. E. Phillips; et. al.

[65] J. R. Commons, "Institutional Economics," p. 654.

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regularities in behaviour. Only organized institutions can reliably create regularities in farm operator and government agency behaviour, since these institutions adopt working rules which define person-to-person relationships with respect to landownership. Organized institutions, as opposed to unorganized ones, exert sufficiently strong sanctions to affect both farmers behaviour and government officials' behaviour. Commons' schema of relations (Figures 1 and 2) provides input for such an analysis.

Regularities in economic behaviour or transactions are a function of five groups of interdependent variables: futurity, scarcity, efficiency, custom and sovereignty. Commons' ideas are translated into a policy analysis framework. Policy analysis requires three fundamental elements, namely structure, conduct and performance. This concept is adopted by Schmid, Seitz and Spitze, and Sharp and Bromley to provide analytical frameworks for natural resource problems.[66] Although the structure-conduct-performance model has its roots in market research, its highly influenced by Commons' ideas.[67] Without incorporating Commons' ideas into the orthodox structure-conduct-performance model, the model's capability to analyze natural resource problems can be seriously questioned in Commons' terminology, structure refers to the identification of institutional alternatives or working rules; conduct refers to person-to-person relations; behaviour and action "citizen" and "official" performance are in terms of various intermediate products; and finally, individual quality of life. In Commons' treatment of structure, he makes a basic distinction between the "going concern" and the "plant". The plant (production activities) results in a flow of events which have increased activity levels over previous production levels. By contrast, the going concern involves the flow of human actions and transactions that mediate and guide the flow of events. This distinction of Commons is based on his more basic distinction between materials and person-to-person relations (or "ownership"). This distinction also identifies non-institutional considerations as opposed to institutional ones in human action. Thus, Commons' concept on structure in the structure-conduct-performance model refers to person-to-person relations (ownership) rather than, say, price variables in the context of the conventional structure concept in other words. Commons' structure is related to the institutional arrangements which deal with regularities in economic behaviour or transactions. The flow of human actions and transactions involves the conduct or behaviour of many individuals with diverse interests and preferences who now function collectively to produce a stream of goods and services. Maintaining a collective flow of actions and transactions in the conduct of any going

[66]A. A. Schmid, *op. cit.*, W. D. Seitz and R. G. F. Spitze, *op. cit.*, and B. M. H. Sharpe and D. W. Bromley, *op. cit.*

[67]A. Randall, "Property Institutions and Economic Behaviour," p. 12.

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concern depends upon working rules that enable each individual to relate himself to others in productive efforts. The operation of any going concern depends also upon the capability of individuals to form stable expectations about behaviour of others by knowing the working rules.[68] Turning to performance, Commons' concern is with the institutionalized behavour of the individual. The structure-conduct-performance model for analyzing soil erosion problems is now proposed which involves a major conceptual framework derived from Commons' institutional economics.

Figure 3 shows the factors and nature of impacts of the farm level soil erosion problem and an approach to develop soil erosion control policies. As the figure indicates, the soil erosion problem can be attributed to soil type or soil characteristic, farming practices, farmers' perception and government policies. The nature of impact is both qualitative and quantitative soil loss in spatial and temporal dimensions. Among all factors affecting soil erosion, the farmer's perception towards land use in the Peace River region is most attributive. When the problems have been identified, it is necessary to determine whether or not the current institutional arrangements are capable of inducing conservation behaviour. Since the level of performance of the current institutional arrangements relating to soil erosion control is not satisfactory,[69] the policy reformulation process becomes a vital activity. To influence the behaviour of a farmer, the proposed scheme in Figure 3 has a wide range of institutional arrangements. The basic policy approached to be used in the development of alternatives are education, economic incentives, legislation and direct investments. Furthermore, within each of these approaches there are numerous alternatives which will have greatly different impacts on the soil erosion control and on the performance of the policy in meeting the social goal.

Working rules restrict individual freedom by limiting the harm that an individual can impose on others and enhancing the freedom of individuals by ensuring protection from harm done by others in the Peace River region, the individual farm operator under the private landownership may be slowly mining his own valuable soil resources and thus imposing a cost on farm operations quite aside from these spatial and temporal damages. The problem is one of searching for a set of working rules or institutional arrangements that (1) impose minimum cost on those whose current behaviour or action requires modification, or (2) provide financial incentives to induce behaviour which is consistent with desired results from a social point of view. The modified or altered

[68]J. R. Commons, *Legal Foundations of Capitalism*, pp. 322–325; and V. Ostrom, "John R. Commons' Foundations for Policy Analysis," pp. 841–842.

[69]W. E. Phillips, et. al., *op. cit.*

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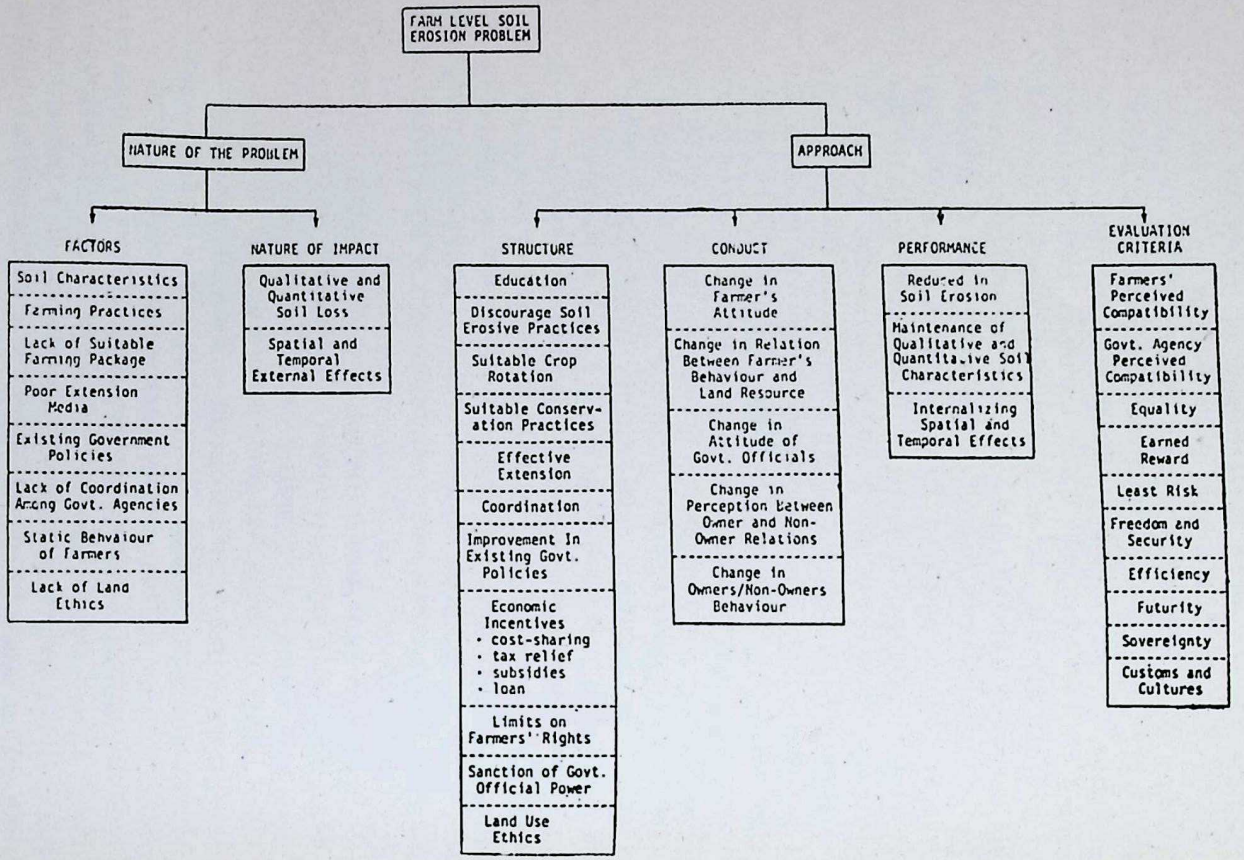
FIGURE 3
SCHEMATIC FOR ANALYZING SOIL EROSION PROBLEMS AND FORMULATION OF POLICIES TO CONTROL FARM LEVEL EROSION



Source: Marothia, D. K., "An Economic and Institutional Analysis of Soil Erosion on Agricultural Land." *Unpublished Ph.D.* dissertation (The University of Albertia, Edminton, 1981): p. 105.

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behaviour would lead to improved performance (less soil erosion) due to a new set of institutional arrangements. As an illustration, currently in the Peace River region, cost-sharing arrangements are only for the construction of grassed waterways. Consider a case in which cost-sharing arrangements for production costs were applied to all of the soil erosion control practices along with the provision of technical advice. This new arrangement alters the relative benefits and cost of prevailing practices and so renders new behaviour which is more attractive to individual farmers. As working rules change, so do institutional arrangement costs. These costs are administrative costs incurred on various government operations to fulfill working rules. Short-run and long-run performances of alternative institutional arrangements can be assessed on the basis of the various criteria given in Figure 3.[70]

VI. Conclusion

The paper has two important policy implications. First, the theoretical significance of the developed approach, and second, the applicability of the suggested approach to other natural resource problems similar to soil erosion problems. The creative synthesis of Commons' institutional-mainstream economics utilized in this research provides an alternative formulation in economics. The major theoretical framework comes from Commons' institutional and legal theories in this approach. Commons' theoretical structure has a treasure of "profound insights" and can not only supplement neoclassical economics, but can make it a complete discipline as is evident from the present analysis. Neoclassical economics is too abstract when used alone to deal with the problems involving several categories of interdependencies and human interactions with respect to natural resource use.

Secondly, the approach used in this study suggests possibilities for analyzing major resource and environmental problems, as well as other problems that are increasingly complex. The suggested approach provides, in many ways, a broader description of the problem to policy-makers and an improved capability to assess public policy preferences.

[70]Details are given in D. K. Marothia, *op. cit.*

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Source: Marothia, D. K., "An Economic and Institutional Analysis of Soil Erosion on Agricultural Land." *Unpublished Ph.D.* dissertation (The University of Albertia, Edminton, 1981): p. 105.

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MEASUREMENT OF POVERTY
(A Refined Approach)

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The measurement of poverty has two aspects. First, it is necessary to specify a poverty line, below which one is considered poor. Second, the intensity of poverty suffered by those below the poverty line must be measured once the poverty line is specified. In the present paper we deal with the second aspect.

In British studies the proportion of the population with incomes below the property line has proved to be popular index of poverty (See Abel Smith and Townsend (1965), Atkinson (1969) and Fiegehen, Lensley and Smith (1977). This index, known as the head count ratio, is written as

$$H = \frac{m}{n}$$

Where m = number of the poor in a group,

n = total population of the group.

Another common measure is the 'poverty gap' (used by the United States Social Security Administration) which is the aggregate shortfall of the income of all the poor taken together from the poverty line.

In order to arrive at a suitable measure of poverty, Sen (1976) proposed the following two axioms :

1. *Monotonicity axiom* : Given other things, a reduction in income of a person below the poverty line must increase the poverty measure.

2. *Transfer axiom* : Given other things, a pure transfer of income from a person below the poverty line to any one who is richer must increase the poverty measure.

Sen (1976) shows that the head count ratio and poverty gap violate one or both of these axioms.

Suppose in a group there are n individuals who are arranged in ascending order of their incomes : $y_1 \leqslant y_2 \leqslant \ldots \leqslant y_m \ldots \leqslant y_n$ which we denote by a vector $y = (y_1, y_2, \ldots, y_m, \ldots, y_n)$. $m(\leqslant n)$ is the number of the poor who have income below the poverty line z. Sen (1976) suggested the following measure of poverty :

$$P_s = \frac{2}{(m+1)\,nz} \sum_{i=1}^{m} (z - y_i)(m + 1 - i)$$

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It can easily be proved that the measure of poverty (P_s) satisfies both monotonicity and transfer axiom.

Sen (1976) proved that for large numbers of the poor P_s may be written as follows :

$$P_s = H[I + (1 - I)\, G_p]$$

where G_p is the Gini Coefficient of the income distribution of the poor and I is called the income gap ratio and is equal to

$$I = \frac{\sum_{i=1}^{m} (z - y_i)}{mz}$$

The main object of the present paper is to propose a new measure of poverty which is simpler than the Sen's measure of poverty and to investigate the properties of the new measure of poverty.

The proposed measure of poverty is the product of head count ratio and a function of the incomes of the poor and the poverty line. The measure of poverty is written as follows :

$$P = H\left[1 - \frac{1}{z}\left(\frac{y_1^r + y_2^r + \ldots + y_m^r}{m}\right)^{1/r}\right]$$

where $0 < r < 1$

Now we investigate the various properties of the measure of poverty P.

1. *Monotonicity axiom* : Suppose the income y_j of the j-th individual is reduced by an amount and the measure of poverty of the group becomes P_1.

According to monotonicity axiom, measure of poverty should increase. So we have to prove that

$$P_1 > P$$

Suppose we have $P_1 < P$

$$\Rightarrow \quad H\left[1 - \frac{1}{z}\left(\frac{y_1^r + y_2^r + \ldots (y_j - c)^r + \ldots + y_m^r}{m}\right)^{1/r}\right]$$

$$< H\left[1 - \frac{1}{z}\left(\frac{y_1^r + y_2^r + \ldots y_j^r + \ldots + y_m^r}{m}\right)^{1/r}\right]$$

$$\Rightarrow \quad y_j - c > y_j$$

which is a contradiction. Hence $P_1 > P$ is true and the measure P satisfies the monotonicity axiom.

1. *Transfer axiom* : Suppose j-th and k-th poor individuals have incomes y_j and y_k and $y_j < y_k$. An amount of income d is transferred from j-th individual to k-th individual. Suppose the measure of poverty of the group becomes P_1.

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We have to prove that $P_1 > P$

Suppose we have $P_1 < P$

$$\Rightarrow H\left[1 - \frac{1}{z}\left(\frac{y_1^r + y_2^r + \ldots + (y_j - d)^r + \ldots + (y_k + d)^r + \ldots + y_m^r}{m}\right)^{1/r}\right]$$

$$< H\left[1 - \tfrac{1}{z}\left(\frac{y_1^r + y_2^r + \ldots y_j^r + \ldots + y_k^r + \ldots + y_m^r}{m}\right)^{1/r}\right]$$

$$\Rightarrow \quad (y_j - d)^r + (y_k + d)^r > y_j^r + y_k^r$$

$$\Rightarrow \quad \binom{r}{1} d\,(y_k^{r-1} - y_j^{r-1}) + \binom{r}{2} d^2\,(y_k^{r-2} + y_j^{r-2}) + \binom{r}{3} d^3\,(y_k^{r-3} - y^{-r}_j)^3 + \ldots > 0$$

Which is a contradiction for $0 < r < 1$. Hence the measure P satisfies transfer axiom.

The measure P satisfies all the desirable properties suggested by Sen. Sen's measure required income data to be arranged in an ascending or descending order and then the allotment of ranks corresponding to the income of each individual. In comparison with Sen's measure, our measure avoids the need for arranging the income data.

So our measure is simple to calculate and satisfies all the desirable properties of measure of poverty like Sen's measure.

Some Remarks on P

1. P lies in the closed interval [0, 1]. The lower limit is attained when incomes of all the individuals are at or above the poverty line, while the upper limit is reached when all individuals have zero income.

2. When all the poor have the same income the measure is independent of r.

3. A transfer from i-th individual to j-th individual (both are poor) will increase P by a larger amount, the richer the individual j (for fixed i).

4. When all the m poor individuals have zero income the measure takes the value H, the head count ratio.

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DATA PROFILE OF ASIAN ECONOMIES

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TABLE 1

FLOW OF PUBLIC AND PUBLICLY GUARANTEED EXTERNAL CAPITAL

S.N.	Countries	Public and publicly guaranteed medium and long-term loans (million of dollars)					
		Gross inflow		Repayment of principal		Net inflow	
		1970	1983	1970	1983	1970	1983
Low-income Economies							
1.	Bangladesh	—	568	—	80	—	488
2.	Nepal	1	70	2	5	−2	66
3.	Burma	16	333	18	86	−2	247
4.	India	890	2,765	307	770	583	1,995
5.	China	—	—	—	—	—	—
6.	Sri Lanka	61	373	27	81	34	292
7.	Pakistan	485	985	114	759	371	226
8.	Afganistan	34	—	15	—	19	—
9.	Bhutan	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—
Lower middle-income							
11.	Indonesia	441	4,965	59	1,295	382	3,670
12.	Philippines	128	2,224	72	602	56	1,623
13.	Thailand	51	1,315	23	419	27	896
14.	Korea, Dem. Rep.	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—
Upper Middle-income							
16.	Malaysia	43	3,026	45	286	−1	2,741
17.	Korea, Rep. of	441	3,634	198	1,999	242	1,635
18.	Hong Kong	—	6	0	28	—	−22
19.	Singapore	58	152	6	278	52	−126
20.	Iran, Islamic Rep.	940	—	235	—	705	—
21.	Iraq	63	—	18	—	46	—
High-income Oil Exporters							
22.	Oman	—	506	—	91	—	416
23.	Saudi Arabia	—	—	—	—	—	—
24.	Kuwait	—	—	—	—	—	—
25.	United Arab Emirates	—	—	—	—	—	—

Source: World Development Report, 1985.

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TABLE 2

BALANCE OF PAYMENTS AND RESERVES—ASIAN COUNTRIES

S.N.	Countries	Current account balance (millions of dollars)		Receipts of workers' remittances (millions of dollars)		Net direct private investment (millions of dollars)		Gross international reserves (Millions of dollars)		Gross international reserves In months of import coverage
		1970	1983	1970	1983	1970	1983	1970	1983	1983
	Low-income Economies									
1.	Bangladesh	—	−77	—	629	—	—	—	546	2.6
2.	Nepal	—	−143	—	—	—	—	94	191	4.1
3.	Burma	−63	−343	—	—	—	—	98	185	2.6
4.	India	−394	−2,780	113	2,617*	6	—	1,023	8,242*	5.4
5.	China	—	4,460	—	—	—	—	—	19,698	10.5
6.	Sri Lanka	−59	−472	3	294	0	38	43	321	1·7
7.	Pakistan	−667	21	86	2,925	23	31	194	2,683	4.5
8.	Afghanistan	—	—	—	—	—	—	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—
	Lower Middle-income									
I1.	Indonesia	−310	−6,294	—	—	83	289	160	4,902	2.2
12.	Philippines	−48	−2,760	—	180	−29	104	255	896	0.9
13.	Thailand	−250	−2,886	—	847	43	348	912	2,556	2.5
14.	Korea, Demo. Rep.	—	—	—	—					

14. Korea, Demo. Rep.	—	—	—	—	—	—	—	—	—
15. Mongolia	—	—	—	—	—	—	—	—	—
Upper Middle-income									
16. Malaysia	8	−3,350	—	—	94	1,370	667	4,673	2.9
17. Korea, Rep. of	−623	−1,578	33	—	66	−57	610	2,463	0.9
18. Hong Kong	—	—	21	—	—	—	—	—	—
19. Singapore	−572	−956	—	—	93	1,389	1,012	9,264	3.5
20. Iran, Islamic Rep.	−507	—	—	—	25	—	217	—	—
21. Iraq	105	—	—	—	24	—	472	—	—
High-income Oil Exporters									
22. Oman	—	572	—	44	—	154	13	872	3.1
23. Saudi Arabia	71	−18,433	—	—	20	−3,653	678	29,040	4.4
24. Kuwait	—	4,590	—	—	—	−241	209	6,161	6.5
25. United Arab Emirates	—	4,550	—	—	—	—	—	2,384	3.2
Industrial Market Economies									
26. Japan	1,980	20,942	—	—	−260	−3,196	4,877	33,845	2.5

Source: World Bank: *World Development Report 1985*, pp. 200 and 201.

* Figures are for 1982, not 1983.

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TABLE 3

EXTERNAL PUBLIC DEBT AND DEBT SERVICE RATIOS

S.N.	Countries	External public debt outstanding and disbursed				Interest payments on external public debt (millions of dollars)		Debt service as percentage of			
		Million of dollars		As percentage of GNP				GNP		Export of goods and services	
		1970	1983	1970	1983	1970	1983	1970	1983	1970	1983
Low-income Economies											
1.	Bangladesh	—	4,185	—	37.7	—	63	—	1.3	—	14.7
2.	Nepal	3	346	0.3	14.1	—	4	0.3	0.3	—	3.0
3.	Burma	101	2,226	4.7	26.3	3	64	0.9	2.4	15.8	33.8
4.	India	7,940	21,277	14.9	11.2	189	553	0.9	0.7	22.0	10.3
5.	China	—	—	—	—	—	—	—	—	—	—
6.	Sri Lanka	317	2,205	16.1	43.7	12	86	2.0	3.3	10.3	11.9
7.	Pakistan	3,060	9,755	30.5	31.3	76	309	1·9	3.4	23.6	28.1
8.	Afganistan	547	—	58.1	—	9	—	2.5	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—
Lower middle-income											
11.	Indonesia	2,443	21,685	27.1	28.9	24	1,256	0.9	3.4	6.9	12.8
12.	Philippines	572	10,385	8.1	30.4	23	650	1.4	3.7	7.2	15.4
13.	Thailand	324	7,060	4.9	18.0	16	531	0.6	2.4	3.4	11.3
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—	—	—

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15. Mongolia	—	—	—	—	—	—	—	—	—	—
Upper middle-income										
16. Malaysia	390	10,665	10.0	38.6	21	669	1.7	3.5	3.6	5.9
17. Korea, Rep. of	1,797	21,472	—	—	70	1,744	—	—	19.4	12.3
18. Hong Kong	2	224	0.1	0.8	—	18	—	0.2	—	—
19. Singapore	152	1,244	7.9	7.6	6	116	0.6	2.4	0·6	1.3
20. Iran, Islamic Rep.	2,193	—	20.8	—	85	—	3.0	—	12.2	—
21. Iraq	274	—	8.8	—	9	—	0.9	—	2.2	—
High-income oil exporters										
22. Oman	—	1,125	—	16·1	—	52	—	2.1	—	3.2

Source: World Development Report, 1985.

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TABLE 4

TERMS OF PUBLIC BORROWING

S.N.	Countries	Commitments (million of dollars)		Average interest rate (per cent)		Average maturity (Years)		Average grace period (Years)	
		1970	1983	1970	1983	1970	1983	1970	1983
Low-income Economies									
1.	Bangladesh	—	593	—	1.7	—	39	—	9
2.	Nepal	17	183	2.8	1.2	27	40	6	10
3.	Burma	57	218	4.3	1.4	16	40	4	10
4.	India	933	1,885	2.4	5.0	35	30	8	6
5.	China	—	—	—	—	—	—	—	—
6.	Sri Lanka	79	281	3.0	1.9	27	40	5	10
7.	Pakistan	942	1,691	2.7	5.4	32	26	12	7
8.	Afghanistan	19	—	1.7	—	33	—	8	—
9.	Bhutan	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—
Lower middle-income									
11.	Indonesia	518	5,597	2.7	8.8	34	15	9	5
12.	Philippines	158	1,814	7.4	9.1	11	16	2	5
13.	Thailand	106	1,189	6.8	8.3	19	20	4	7
14.	Korea, Dem. Rep.	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—

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Upper middle-income								
16. Malaysia	83	3,101	6.1	9.5	19	11	5	6
17. Korea Rep. of	677	3,320	6.0	9.8	19	12	5	4
18. Hong Kong	—	—	—	7.5	—	13	—	4
19. Singapore	69	82	6.8	9.7	17	9	4	2
20. Iran, Islamic Rep.	1,342	—	6.2	—	12	—	3	—
21. Iraq	28	—	3.3	—	11	—	2	—
High-income oil exporters								
22. Oman	—	415	—	10.6	—	8	—	3

Source: World Bank, *World Development Report*, 1985.

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TABLE 5

POPULATION GROWTH AND PROJECTIONS

S.N.	Countries	Average annual growth of population (per cent)			Population (millions)			Hypothetical size of stationary population (millions)	Assumed year of reaching net reproduction rate of 1	Population momentum
		1965–73	1973–83	1980–2000	1983	1990	2000			1985
Low-income economies										
1.	Bangladesh	2.6	2.4	2.3	95	114	141	310	2025	1.9
2.	Nepal	2.0	2.6	2.6	16	19	20	74	2040	1.8
3.	Burma	2.3	2.0	2.3	35	43	53	115	2025	1.9
4.	India	2.3	2.3	1.8	733	844	994	1,700	2010	1.8
5.	China	2.7	1.5	1.2	1,019	1,106	1,242	1,571	2010	1.6
6.	Sri Lanka	2.1	1.7	1.8	15	18	21	32	2005	1.7
7.	Pakistan	3.1	3.0	2.4	90	106	133	330	2035	1.9
8.	Afganistan	2.3	2.6	2·3	17	20	25	76	2045	1.9
9.	Bhutan	1.3	1.9	2.2	1	1	2	4	2035	1.8
10.	Viet Nam	3.1	2.7	2.4	59	70	88	170	2015	1.9
Lower-middle income										
11.	Indonesia	2.1	2.3	1.9	156	179	212	368	2010	1.8
12.	Philippines	2.9	2.7	2.1	52	61	73	126	2010	1.9
13.	Thailand	2.9	2.3	1.7	49	56	65	100	2000	1.8

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14. Korea, Demo. Rep.	2.8	2.5	2.1	19	22	27	46	2010	1.8
15. Mongolia	3.1	2.8	2.4	2	2	3	5	2015	1.9
Upper middle-income									
16. Malaysia	2.6	2.4	2.0	15	17	21	33	2005	1.8
17. Korea, Rep. of	2.2	1.6	1.4	40	45	50	70	2000	1.6
18. Hong Kong	2.0	2.5	1.3	5	6	7	7	2010	1.4
19. Singapore	1.8	1.3	1.0	3	3	3	3	2010	1.4
20. Iran, Islamic Rep.	3.3	3.1	3.0	43	53	71	166	2020	1.9
21. Iraq	3.3	3.6	3.4	15	19	26	73	2025	2.0
High-income oil exporters									
22. Oman	2.9	4.8	2.9	1	1	2	4	2020	1.9
23. Saudi Arabia	4.0	4.7	3.6	10	14	19	56	2030	1.9
24. Kuwait	8.3	6.4	3.5	2	2	3	5	2010	1.9
25. United Arab Emirates	11.8	11.3	3.7	1	2	2	4	2015	1.4
Industrial market economies									
26. Japan	1.2	0.9	0.5	119	123	128	128	2010	1.2

Source: World Bank: *World Development Report*, 1985.

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TABLE 6

DEMOGRAPHIC AND FERTILITY-RELATED INDICATORS

S.N.	Countries	Crude birth rate per thousand population		Crude death rate per thousand population		Percentage change in		Total fertility rate		Percentage of married women of childbearing age using contraceptives	
						Crude birth rate	Crude death rate				
		1965	1983	1965	1983	1965–83	1965–83	1983	2000	1970	1982
Low-income economies											
1.	Bangladesh	47	42	22	16	−11.9	−27.0	6.0	3.7	—	25
2.	Nepal	46	42	24	18	−9.0	−25.5	6.3	5.4	—	7
3.	Burma	42	38	19	13	−9.6	−33.5	5.3	3.6	—	5
4.	India	45	34	21	13	−25.0	−39.6	4.8	2.9	12	32
5.	China	39	19	13	7	−51.2	−50.8	2.3	2.0	—	71
6.	Sri Lanka	33	27	8	6	−20.2	−26.8	3.4	2.3	—	55
7.	Pakistan	48	42	21	15	−12.7	−29.4	5.8	4.2	6	14
8.	Afghanistan	54	54	29	29	0.6	−2.7	8.0	5.6	2	—
9.	Bhutan	43	43	32	21	−0.2	−34.6	6.2	5.3	—	—
10.	Viet Nam	45	35	17	8	−22.2	−53.5	4.9	3.1	—	21
Lower middle-income											
11.	Indonesia	43	34	20	13	−20.9	−37.3	4.3	2.8	—	58
12.	Philippines	46	31	12	7	−32.6	−43.7	4.2	2.7	15	48
13.	Thailand	43	27	12	8	−37.2	−35.5	3.4	2.2	15	59

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14. Korea, Demo. Rep.	39	30	12	7	−22.7	−38.5	4.0	2.6	—	—
15. Mongolia	42	34	12	7	−18.2	−43.1	4.8	3.1	—	—
Upper middle-income										
16. Malaysia	41	29	12	6	−29.4	−46.8	3.7	2.4	33	42
17. Korea, Rep. of	36	23	12	6	−36.3	−46.1	2.7	2.1	25	58
18. Hong Kong	28	17	6	5	−39.3	−13.8	1.8	2.0	42	80
19. Singapore	31	17	6	5	−44.6	−9.1	1.7	1.9	60	71
20. Iran, Islamic Rep.	50	40	17	10	−19.5	−39.9	5.6	4.3	—	23
21. Iraq	49	45	18	11	−9.2	−38.9	6.7	5.2	14	—
High-income oil exporters										
22. Oman	50	47	24	15	−6.0	−37.5	7.1	4.0	—	—
23. Saudi Arabia	49	43	20	12	−11.1	−41.4	7.1	5.7	—	—
24. Kuwait	47	35	8	3	−25.5	−60.5	5.7	3.0	—	—
25. United Arab Emirates	41	27	15	4	−34.1	−73.3	5.9	4.1	—	—
Industrial market economies										
26. Japan	19	13	7	6	−30.5	−15.5	1.7	1.9	56	56

Source: World Bank: *World Development Report*, 1985.

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TABLE 7
LABOUR FORCE

S.N.	Countries	Percentage of population of working age (15–64 years)		Percentage of labour force in						Average annual growth of labour force (per cent)		
				Agriculture		Industry		Services				
		1965	1983	1965	1981	1965	1981	1965	1981	1965–73	1973–83	1980–2000
Low-income economies												
1.	Bangladesh	51	54	87	74	3	11	10	15	2.3	2.8	2.9
2.	Nepal	56	54	95	93	2	2	3	5	1.6	2·3	2.5
3.	Burma	57	55	—	67	—	10	—	23	1.3	1.4	2.2
4.	India	54	57	74	71	11	13	15	16	1.8	2.1	2.1
5.	China	55	63	—	74	—	13	—	13	2.4	1.2	1.8
6.	Sri Lanka	55	60	56	54	14	14	30	32	2.0	2.1	2.2
7.	Pakistan	50	53	60	57	19	20	21	23	2.3	3.2	2.7
8.	Afghanistan	55	53	84	79	7	8	9	13	1.9	2.3	2.4
9.	Bhutan	56	56	95	93	2	2	3	5	1.0	1.9	2.1
10.	Viet Nam	—	55	79	71	6	10	15	19	—	—	2.9
Lower middle-income												
11.	Indonesia	54	56	71	58	9	12	20	30	1.9	2.3	2.4
12.	Philippines	52	56	57	46	16	17	27	37	2.1	3.0	2.5
13.	Thailand	51	59	82	76	5	9	13	15	2.4	3.1	2.1
14.	Korea, Demo. Rep.	52	57	59	49	25	33	16	18	2.6	2.9	2.7

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15. Mongolia	54	55	66	55	15	22	19	23	2.2	2.6	2.9
Upper middle-income											
16. Malaysia	50	58	60	50	13	16	27	34	2.9	3.2	2.7
17. Korea, Rep. of	54	64	58	34	13	29	29	37	2.9	2.7	1.9
18. Hong Kong	56	69	6	3	54	57	40	40	3.6	4.1	1.3
19. Singapore	54	67	6	2	26	39	68	59	3.4	2.3	1.1
20. Iran, Islamic Rep.	51	53	50	39	26	34	24	27	3.1	3.0	3.5
21. Iraq	51	51	50	42	20	26	30	32	2.9	3.1	3.7
High-income oil exporters											
22. Oman	53	53	—	—	—	—	—	—	—	—	—
23. Saudi Arabia	53	54	69	61	11	14	20	25	3.9	5.8	3.2
24. Kuwait	60	57	1	2	34	34	65	64	5.3	7.1	3.2
25. United Arab Emirates	—	68	—	—	—	—	—	—	—	—	—
Industrial market economies											
26. Japan	68	68	26	12	32	39	42	49	1.7	1.1	0.7

Source: World Bank: *World Development Report*, 1985.

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TABLE 8
URBANISATION

S.N.	Countries	Urban population				Percentage of urban population				Number of cities of over 500,000 persons	
		As percentage of total population		Average annual growth rate (per cent)		In largest city		In cities of over 500,000 persons			
		1965	1983	1965–73	1973–83	1960	1980	1960	1980	1960	1980
Low-income economies											
1.	Bangladesh	6	17	6.6	7.6	20	30	20	51	1	3
2.	Nepal	4	7	4.3	8.2	41	27	0	0	0	0
3.	Burma	21	29	4.0	3.9	23	23	23	23	1	2
4.	India	18	24	4.0	4.2	7	6	26	39	11	36
5.	China	18	21	—	—	6	6	42	45	38	78
6.	Sri Lanka	20	26	3.4	2.9	28	16	0	16	0	1
7.	Pakistan	24	29	4.3	4.3	20	21	33	51	2	7
8.	Afghanistan	10	17	5.6	6.2	33	17	0	17	0	1
9.	Bhutan	4	4	−2.1	4.6	0	0	0	0	0	0
10.	Viet Nam	16	20	5.5	2.4	32	21	32	50	1	4
Lower middle-income											
11.	Indonesia	16	24	4.1	4.8	20	23	34	50	3	9
12.	Philippines	32	39	4.0	3.8	27	30	27	34	1	2
13.	Thailand	13	18	4.8	3.6	65	69	65	69	1	1
14.	Korea, Demo. Rep.	45	62	4.9	4.2	15	12	15	19	1	2

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15. Mongolia	42	54	4.6	4.2	53	52	0	0	0	0
Upper middle-income										
16. Malaysia	26	31	3.3	3.5	19	27	0	27	0	1
17. Korea Rep. of	32	62	6.5	4.8	35	41	61	77	3	7
18. Hong Kong	89	92	2.1	2.7	100	100	100	100	1	1
19. Singapore	100	100	1.8	1.3	100	100	100	100	1	1
20. Iran, Islamic Rep.	37	53	5.4	5.1	26	28	26	47	1	6
21. Iraq	50	69	5.7	5.3	35	55	35	70	1	3
High-income oil exporters										
22. Oman	4	25	10.8	17.6	—	—	—	—	—	—
23. Saudi Arabia	39	71	8.4	7.4	15	18	0	33	0	2
24. Kuwait	75	92	9.3	7.8	75	30	0	0	0	0
25. United Arab Emirates	56	79	16.7	11.2	—	—	—	—	—	—
Industrial market economies										
26. Japan	67	76	2.4	1.3	18	22	35	42	5	9

Source: World Bank, *World Development Report*, 1985.

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TABLE 9
INDICATORS RELATED TO LIFE EXPECTANCY

S.N.	Countries	Life expectancy at birth (Years)				Infant mortality rate (aged under 1)		Child death rate (aged 1–4)	
		Male		Female					
		1965	1983	1965	1983	1965	1983	1965	1983
Low-income economies									
1.	Bangladesh	45	49	44	50	153	132	24	19
2.	Nepal	40	47	39	45	184	143	30	21
3.	Burma	45	53	48	57	143	93	21	11
4.	India	46	56	44	54	151	93	23	11
5.	China	55	65	59	69	90	38	11	2
6.	Sri Lanka	63	67	64	71	63	37	6	2
7.	Pakistan	46	51	44	49	150	119	23	16
9.	Afghanistan	34	—	35	—	223	—	39	—
9.	Bhutan	34	44	32	42	184	162	30	26
10.	Viet Nam	47	62	50	66	89	53	8	4
Lower middle-income									
11.	Indonesia	43	52	45	55	138	101	20	13
12.	Philippines	55	63	58	66	90	49	11	4
53.	Thailand	53	61	58	65	90	50	11	4
14.	Korea, Demo. Rep.	55	63	58	67	64	32	6	2
15.	Mongolia	55	63	58	67	89	49	11	4
Upper middle-income									
16.	Malaysia	56	65	59	69	57	29	5	2
17.	Korea Rep. of	55	64	58	71	64	29	6	2
18.	Hong Kong	66	74	71	78	28	10	2	—
19.	Singapore	63	70	68	75	26	11	1	—
20.	Iran, Islamic Rep.	52	60	52	60	150	100	32	13
21.	Iraq	50	57	53	61	121	71	21	6
High-income oil exporters									
22.	Oman	40	51	42	54	175	121	43	21
23.	Saudi Arabia	45	55	47	58	164	101	38	13
24.	Kuwait	61	69	65	74	66	29	5	1
25.	United Arab Emirates	57	68	61	73	104	44	14	2
Industrial market economies									
26.	Japan	68	74	73	79	18	7	1	—

Source: World Bank, *World Development Report*, 1985.

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TABLE 10
HEALTH-RELATED INDICATORS

S.N.	Countries	Population per Physician		Population per Nursing person		Daily calorie supply per capita: Total	Daily calorie supply per capita: As percentage of requirement
		1965	1980	1965	1980	1982	1982
	Low-income economies						
1.	Bangladesh	—	7,810	—	22,570	1,922	83
2.	Nepal	46,180	30,060	—	33,420	2,018	86
3.	Burma	11,660	4,680	11,410	4,770	2,483	115
4.	India	4,860	3,690	6,500	5,460	2,047	93
5.	China	—	1,740	—	1,710	2,562	109
6.	Sri Lanka	5,750	7,170	3,210	1,340	2,393	107
7.	Pakistan	3,160	3,480	9,900	5,820	2,277	99
8.	Afghanistan	15,770	16,730	24,450	26,000	2,285	94
9.	Bhutan	3,310	18,160	—	7,960	—	—
10.	Viet Nam	—	4,190	—	2,930	2,017	93
	Lower middle-income						
11.	Indonesia	31,820	11,530	9,500	2,300	2,393	111
12.	Philippines	1,310	7,970	1,130	6,000	2,393	106
13.	Thailand	7,230	7,100	5,020	2,400	2,296	103
14.	Korea, Demo. Rep.	—	430	—	—	3,051	130
15.	Mongolia	710	450	310	240	2,798	115
	Upper-middle income						
16.	Malaysia	6,220	—	1,320	940	2,688	120
17.	Korea, Rep. of	2,740	1,440	2,990	350	2,936	125
18.	Hong Kong	2,400	1,210	1,220	790	2,774	121
19.	Singapore	1,910	1,150	600	320	2,954	128
20.	Iran, Islamic Rep.	3,770	6,090	4,170	2,520	2,855	119
21.	Iraq	4,970	1,800	2,910	2,160	2,840	118
	High-income oil exporters						
22.	Oman	23,790	1,900	6,380	500	—	—
23.	Saudi Arabia	9,400	1,670	6,060	1,170	3,111	129
24.	Kuwait	830	570	270	180	3,423	—
25.	United Arab Emirates	—	910	—	340	3,591	—
	Industrial market economies						
26.	Japan	930	780	240	240	2,891	124

Source: World Bank, *World Development Report*, 1985.

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TABLE 11
EDUCATION

S.N.	Countries	Number enrolled in primary school as percentage of age group						Number enrolled in secondary school as percentage of age group		Number enrolled in higher education as percentage of population aged 20–24	
		Total		Male		Female					
		1965	1982	1965	1982	1965	1982	1965	1982	1965	1982
Low-income economies											
1.	Bangladesh	49	60	67	68	31	51	13	15	1	4
2.	Nepal	20	73	36	102	4	42	5	21	1	3
3.	Burma	71	84	76	87	65	81	15	20	1	4
4.	India	74	79	89	93	57	64	27	30	5	9
5.	China	—	110	—	123	—	97	—	35	—	1
6.	Sri Lanka	93	103	98	106	86	101	35	54	2	4
7.	Pakistan	40	44	59	57	20	31	12	14	2	2
8.	Afghanistan	16	35	26	56	5	13	1	12	—	1
9.	Bhutan	7	23	13	30	1	16	—	3	—	—
10.	Viet Nam	—	113	—	120	—	105	—	48	—	3
Lower-middle income											
11.	Indonesia	72	120	79	124	65	116	12	33	1	4
12.	Philippines	113	106	115	107	111	195	41	64	19	27
13.	Thailand	78	96	82	98	74	94	14	29	2	22

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14. Korea, Demo. Rep.	—	—	—	—	—	—	—	—	—	—
15. Mongolia	96	106	98	105	97	108	66	89	8	26
Upper middle-income										
16. Malaysia	90	92	96	93	84	91	28	49	2	5
17. Korea, Rep. of	101	100	103	102	99	99	35	89	6	24
18. Hong Kong	103	105	106	107	99	103	29	67	5	11
19. Singapore	105	108	110	111	100	105	45	66	10	11
20. Iran, Islamic Rep.	63	97	85	112	40	81	18	40	2	4
21. Iraq	74	109	102	114	45	103	28	59	4	10
High-income oil exporters										
22. Oman	—	74	—	90	—	57	—	22	—	—
23. Saudi Arabia	24	67	36	79	11	54	4	32	1	9
24. Kuwait	116	91	129	92	103	91	52	77	—	15
25. United Arab Emirates	—	132	—	133	—	131	—	67	—	7
Industrial market economies										
26. Japan	100	100	100	100	100	100	82	92	13	30

Source: World Bank, *World Development Report*, 1985.

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TABLE 12

CENTRAL GOVERNMENT EXPENDITURE

S.N.	Countries	Percentage of total expenditure												Total expenditure (per cent of GNP)		Overall surplus/ deficit (per cent of GNP)	
		Defence		Education		Health		Housing amenities social security and welfare		Economic services		Others					
		1972	1982	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982
Low-income economies																	
1.	Bangladesh	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.	Nepal	7.2	5.4	7.2	9.9	4.7	4.5	0.7	4.3	57.2	53.1	23.0	22.7	8.5	17.2	−1.2	−5.2
3.	Burma	—	19.0	—	11.2	—	7.0	—	9.3	—	35.2	—	18.4	—	17.1	—	0.7
4.	India	—	20.2	—	1.9	—	2.2	—	4.3	—	24.3	—	47.1	—	15.1	—	−6.6
5.	China	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.	Sri Lanka	—	1.4	—	7.4	—	3.3	—	12.8	—	13.1	—	62.0	—	34.4	—	−14.4
7.	Pakistan	—	33.5	—	2.2	—	1.1	—	6.8	—	31.0	—	25.3	—	16.1	—	−4.5
8.	Afghanistan	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9.	Bhutan	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10.	Viet Nam	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lower middle-income																	
11.	Indonesia	—	13.9	—	8.4	—	2.5	—	1.1	—	31.3	—	42.8	16.2	23.5	−2.6	−2.1
12.	Philippines	10.9	13.6	16.3	16.0	3.2	5.3	4.3	4.2	17.6	53.7	47.7	7.2	13.4	12.2	−2.0	−4.3
13.	Thailand	20.2	20.6	19.9	20.7	3.7	5.0	7.0	4.9	25.7	22.2	23.5	26.5	17.2	19.9	−4.3	−5.9

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14. Korea Demo. Rep.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15. Mongolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper middle-income																
16. Malaysia	18.5	15.1	23.4	15.9	6.8	4.4	4.4	10.5	14.2	29.0	32.7	25.2	27.7	41.0	−9.8	−15.9
17. Korea, Rep. of	25.8	31.3	15.9	19.5	1.2	1.4	5.8	10.5	25.6	13.3	25.7	24.0	18.1	19.5	−3.9	−3.2
18. Hong Kong	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19. Singapore	35.3	22.9	15.7	19.2	7.8	6.4	3.9	8.2	9.9	14.2	27.3	29.1	16.8	22.6	1.3	2.7
20. Iran, Islamic Rep.	24.1	10.2	10.4	13.6	3.6	5.5	6.1	12.3	30.6	24.3	25.2	34.2	30.8	—	−4.6	—
21. Iraq	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High-income oil exporters																
22. Oman	39.3	49.4	3.7	7.7	5.9	3.1	3.0	1.7	24.4	23.9	23.6	14.1	62.1	49.2	−15.3	−9.3
23. Saudi Arabia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24. Kuwait	8.4	10.9	15.0	8.8	5.5	5.4	14.2	14.3	16.6	27.2	40.1	33.5	34.4	40.7	17.4	7.6
25. United Arab Emirates	24.5	36.4	16.2	7.5	4.5	7.1	6.4	3.7	18.2	7.0	30.2	38.4	—	18.4	—	—
Industrial market economies																
26. Japan	—	—	—	—	—	—	—	—	—	—	—	—	12.7	18.9	—	—

Source: World Bank, *World Development Report*, 1985.

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TABLE 13

CENTRAL GOVERNMENT CURRENT REVENUE

Countries	Percentage of total current revenue												Total current revenue (per cent of GNP)	
	Tax revenue										Current non-tax revenue			
	Taxes on income, profit and capital gain		Social security contributions		Domestic taxes on goods and services		Taxes on international trade and transactions		Other taxes					
	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982	1972	1982
Low-income economies														
1. Bangladesh	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Nepal	4.1	7.2	—	—	26.5	38.5	36.7	31.3	19.0	7.1	13.7	15.9	5.2	8.7
3. Burma	—	3.2	—	—	—	39.5	—	19.2	—	—	—	38.2	—	16.2
4. India	—	18.7	—	—	—	39.0	—	23.5	—	0.6	—	18.2	—	13.6
5. China	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6. Sri Lanka	—	17.4	—	—	—	34.1	—	39.8	—	1.9	—	6.8	—	17.2
7. Pakistan	—	16.5	—	—	—	33.4	—	31.4	—	0.3	—	18.4	—	14.6
8. Afghanistan	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9. Bhutan	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10. Viet Nam	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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Lower middle-income														
11.	Indonesia	45.5	76.9	—	—	22.7	10.4	17.5	4.7	3.6	1.4	10.6	6.7	14.4	22.2
12.	Philippines	13.8	21.8	—	—	24.3	40.9	23.0	23.9	29.7	3.1	9.3	10.4	12.4	11.2
13.	Thailand	12.1	21.4	—	—	46.3	47.7	28.7	18.9	1.8	1.9	11.2	10.1	12.9	13.9
14.	Korea, Demo. Rep.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.	Mongolia	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper middle-income															
16.	Malaysia	25.2	36.9	0.1	0.5	24.2	15.4	27.9	28.3	1.4	1.8	21.2	17.0	21.2	29.2
17.	Korea Rep. of	29.2	23.9	0.8	1.1	41.7	44.5	10.7	13.3	5.2	3.6	12.3	13.6	13.2	19.1
18.	Hong Kong	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19.	Singapore	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20.	Iran, Islamic Rep.	7.9	7.3	2.7	7.3	6.4	4.0	14.6	8.0	4.9	4.1	63.6	69.4	26.2	—
21.	Iraq	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High-income oil exporters															
22.	Oman	71.1	27.9	—	—	—	0.5	3.0	1.5	2.3	0.4	23.6	69.8	47.4	41.2
23.	Saudi Arabia	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24.	Kuwait	68.8	2.1	—	—	19.7	0.6	1.5	2.0	0.2	0.3	9.9	95.0	55.2	57.4
25.	United Arab Republic	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial market economies															
26.	Japan	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Source: World Bank, *World Development Report, 1985.*

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TABLE 14

INCOME DISTRIBUTION

S.No.	Countries	Year	Percentage share of household income, by percentile groups of households					
			Lowest 20 per cent	Second quintile	Third quintile	Fourth quintile	Highest 20 per cent	Highest 10 per cent
	Low-income economies							
1.	Bangladesh	1976–77	6.2	10.9	15.0	21.0	46.9	32.0
2.	Nepal	1976–77	4.6	8.0	11.7	16.5	59.2	46.5
3.	Burma		—	—	—	—	—	—
4.	India	1975–76	7.0	9.2	13.9	20.5	49.4	33.6
5.	China		—	—	—	—	—	—
6.	Sri Lanka	1969–70	7.5	11.7	15.7	21.7	43.4	28.2
7.	Pakistan		—	—	—	—	—	—
8.	Afghanistan		—	—	—	—	—	—
9.	Bhutan		—	—	—	—	—	—
10.	Viet Nam		—	—	—	—	—	—
	Lower middle-income							
11.	Indonesia	1976	6.6	7.8	12.6	23.6	49.4	34.0
12.	Philippines	1970–71	5.2	9.0	12.8	19.0	54.0	38.5
13.	Thailand	1975–76	5.6	9.6	13.9	21.1	49.8	34.1
14.	Korea, Demo. Rep.		—	—	—	—	—	—
15.	Mongolia		—	—	—	—	—	—
	Upper middle-income							
16.	Malaysia	1973	3.5	7.7	12.4	20.3	56.1	39.8
17.	Korea, Rep. of	1976	5.7	11.2	15.4	22.4	45.3	27.5
18.	Hong Kong	1980	5.4	10.8	15.2	21.6	47.0	31.3
19.	Singapore		—	—	—	—	—	—
20.	Iran, Islamic Republic		—	—	—	—	—	—
21.	Iraq		—	—	—	—	—	—
	High-income oil exporters							
22.	Oman		—	—	—	—	—	—
33.	Saudi Arabia		—	—	—	—	—	—
24.	Kuwait		—	—	—	—	—	—
25.	United Arab Emirates		—	—	—	—	—	—
	Industrial market economies							
26.	Japan	1979	8.7	13.2	17.5	23.1	37.5	22.4

Source: World Bank, *World Development Report, 1985.*

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SOCIETY FOR ASIAN DEVELOPMENT

C-32, Shakti Nagar Extension, Delhi-110052, INDIA

1. Introduction

The Society for Asian Development (SOFAD) was founded at the time of Fifth World Congress of Economists held at Tokyo in August 1977. It is an international research organisation of economists from all over the world. The main aim of the Society is to promote study and research in the problems of economic development in general and that of the Asian countries in particular. It seeks to attain these objectives through conferences, seminars, workshops and publications. The Society has got its headquarters at Delhi, India. The economists who are actively associated with the activities of the Society include Sir Austin Robinson (Cambridge University), Irma Adelman (University of California), George Rosen (University of Illinois), H. W. Singer (University of Sussex), Kiyoshi Abe (Chiba University), Jacov Sirotkovic (Yugoslav Academy of Arts and Sciences), John C. O'Brien (California State University), Jozsef Bognar (Hungarian Academy of Science), Gautam Mathur (Institute of Applied Manpower Research, New Delhi), Soumitra Sharma (University of Zagreb, Yugoslavia), Rameshwar Tandon (Institute for Social and Economic Change, India) and R.K. Sinha (Rohilkhand University, India). R.L. Goel, former professor of economics at Meerut University, India is the chairman of the Society. The Society has got an international advisory committee to guide and supervise its activities.

2. Conferences

The Society in collaboration with the University of Zagreb and the Yugoslav Academy of Art and Science organised the First International Conference of Economists on *Economic Development and the World Debt Problem*, which was held at Zagreb, Yugoslavia from September 8–11, 1987. The conference was attended by one hundred economists from all over the world, prominent among them were Paul Streteen, H. W. Singer, Gerald Meier, Gustav Ranis, Jacov Sirotkovic and Kiyoshi Abe. Prof. R. L. Goel also attended the conference as a representative of the SOFAD. The proceedings of this conference have been published in 7 volumes, one for each session. The selected papers of the conference are being published by the Macmillan & Co., London, England.

The Society is planning to have two Round-table Conferences during 1988 and 1989. The themes of the Round-table Conferences will be:

- Food and Nutrition Status of the Developing Countries in Asia
- Urbanisation in the Developing Countries—the problem and a challenge

The Second International Conference of the Society is scheduled for 1990. The theme and venue of the conference will be announced as soon as finalised.

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3. Asian Journal of Economics

Asian Journal of Economics and Social Studies is the organ of the Society and is being published as a quarterly research Journal since 1982. It is now running in its fifth volume and is recognised as an important reference material on Asian countries and development problems of poor countries. A distinguishing feature is the **Asian Data Bank** which is being published regularly.

4. Research Programme

The Society has already completed its study on *Protectionism of Developed Countries and its Impact on Developing Countries.* The comprehensive report is in the process of publication. Besides this, the Society has sponsored the following projects:

1. Food aid and maintenance of human capital in developing countries
2. Foreign aid and industrialisation of developing Asian countries
3. An appraisal of food for work programme in Madhya Pradesh, India
4. Indo-Yugoslav economic relations

5. Publications

The Society is planning to undertake the preparation of **Readings in Asian Economic Development.**

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